the OIL AND GAS JOURNAL

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60,573,000 BARRELS, OKLAHOMA'S OIL PRODUCTION FIRST HALF 1944

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t year fewer than 70 wells were and production approximated 0 barrels. In 1905, more than 2,500 wells were completed and over 8,000,000 barrels of oil produced.

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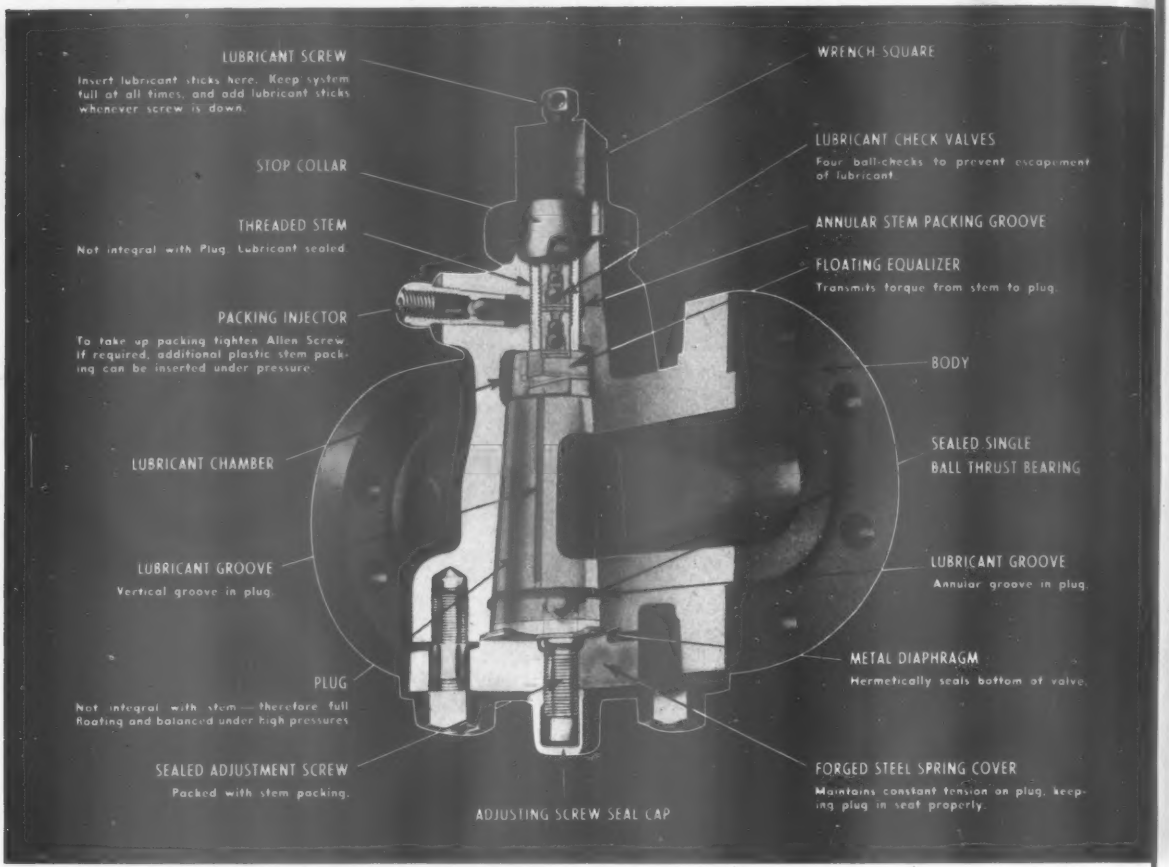
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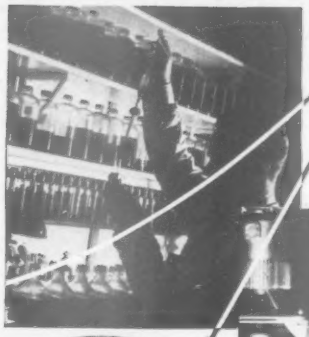

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Trends

Crude-Oil Production By States—Page 118

CRUDE-OIL STOCKS 221,490,000 bbl. as of September 23—down 499,000 bbl. One year ago 233,978,000 bbl.

GASOLINE STOCKS 78,372,000 bbl. as of September 23—down 354,000 bbl. One year ago 69,095,000 bbl.

RESIDUAL FUEL-OIL STOCKS 62,514,000 bbl. as of September 23—up 274,000 bbl. One year ago 66,896,000 bbl.

GAS OIL AND DISTILLATE STOCKS 44,781,000 bbl. as of September 23—up 1,225,000 bbl. One year ago 39,116,000 bbl.

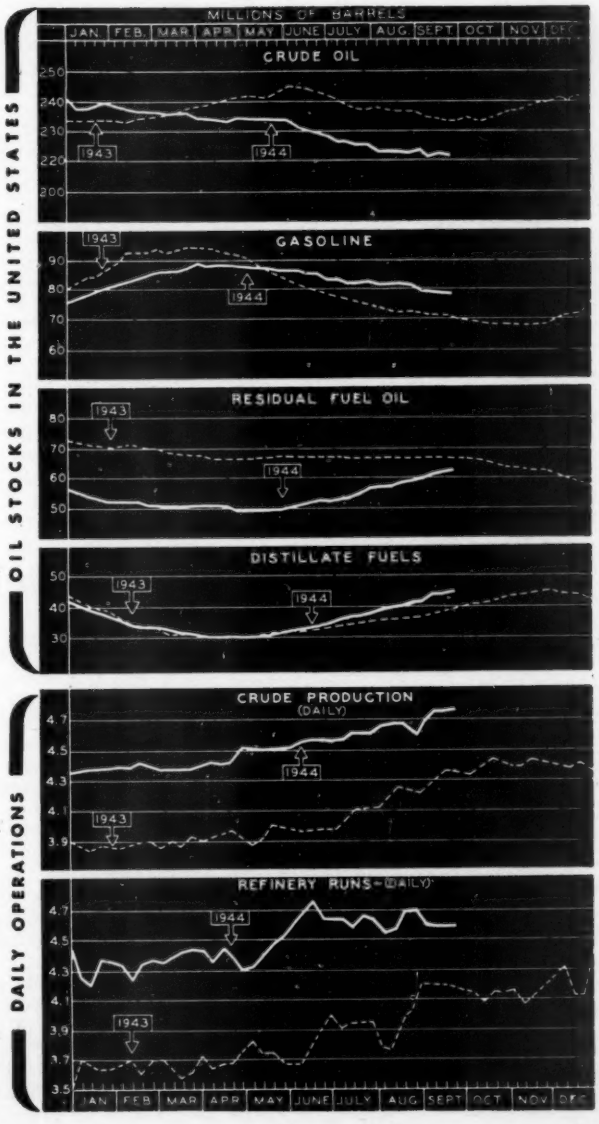
CRUDE-OIL PRODUCTION 4,758,200 bbl. as of September 30—up 20,690 bbl. One year ago 4,355,800 bbl.

REFINERY RUNS 4,608,000 bbl. daily week ended September 23—up 23,000 bbl. Year ago 4,175,000 bbl.

DEVELOPMENTS of the past 2 weeks show conclusively that the petroleum industry is facing the most determined drive yet launched by the agricultural bloc for a share of the postwar market for motor fuel and for a larger portion of the industrial-alcohol demand. Sen. Guy M. Gillette of Iowa, perennial champion of the agricultural-alcohol pressure group, announced resumption of hearings before his subcommittee in investigating uses for farm products. Also he flailed away at the petroleum industry, charging it with attempts to "squeeze out" the farmer and secure a postwar synthetic rubber monopoly.

OBVIOUSLY, the agricultural bloc was bestirred to attack the petroleum industry with renewed vigor by the special report on production costs of synthetic rubber issued August 31. Essentially, the synthetic-rubber cost report disclosed that butadiene produced by petroleum hydrocarbon processes costs about 8 cents per pound against 37 cents per pound if manufactured from 190-proof alcohol.

SENATOR GILLETTE'S latest argument for using grain alcohol in motor fuel is based chiefly on the assumption that the Government already owns the necessary manufacturing plants and that such a move will relieve the treasury from payment of certain farm subsidies. The petroleum industry, of course, views the postwar motor-fuel situation strictly from a competitive standpoint and realizes fully that crude oil is the most economic raw material known for the production of gasoline. Alcohol made from corn between 1931 and 1940 cost around 27 cents per gallon compared with a refinery gasoline price for the same period of around 5 cents per gallon. Furthermore, there is a grave question of productive capacity, even though admixture of alcohol should become compulsory. If an admixture of only 5 per cent of alcohol with motor fuel were required, annual consumption of more than 1 billion gallons would result, about 10 times the total prewar consumption for all purposes. Economically, the petroleum industry has nothing to fear from alcohol-blend proponents. But responsiveness of Congress to desires of the agricultural bloc, regardless of merits in its requests, gives ample warning of a relentless fight to intrude a higher cost product in postwar motor-fuel economy.



Plans Under Way to Rehabilitate Allied Oil Properties in Romania

by Henry D. Ralph

WASHINGTON. — Plans for rehabilitating the Romanian oil industry as quickly as possible are being actively studied by Washington officials, but as yet little is known about the amount of new materials and equipment that will be needed nor how soon it may be possible to get materials and construction crews into the Ploesti area.

Under the terms of the United States, British and Russian armistice agreement with Romania, all Romanian industrial and transportation facilities, utilities, fuel supplies, and other facilities are to be made available to the Soviet high command for use in military operations within Romania. This stipulation would indicate that the Soviets intend to make use of Romanian oil for continued fighting in the Balkans.

Under the armistice the Romanian Government agreed to restore all legal rights and interests of the United Nations and their nationals on Romanian territory as they existed before the war and to return their property in complete good order. The agreement also states that compensation will be paid by Romania for losses caused to the property of Allied states and their nationals in Romania during the war, the amount of compensation to be fixed at a later date.

These terms apparently mean that American, British, and other foreign oil companies will get back their properties and concessions and that the Romanian Government will pay for their restoration, although most people assume that the bill will be charged up against Germany and full payment is considered somewhat doubtful. Actual rebuilding of refineries and other oil facilities undoubtedly will have to be done by the companies themselves, regardless of eventual compensation, and the United States is the only practical source of the needed equipment. The companies are known to have detailed plans of their former installations and probably even have prepared specifications for replacing whatever units may have been destroyed. But means of transporting refinery equipment to Ploesti may not be available for some time.

The extent of damage is not yet known in any detail, but it is assumed that refineries are from 50 to 75 per cent destroyed and will have to be almost entirely rebuilt. Since Romania is still a zone of military operations it is not believed that any civilian oil experts have yet been granted permission to enter, but it is understood that some United States and British Army engineers have made preliminary examinations of refinery damage and that a start has been made toward planning for their restoration.

Engineers Recommend Permanent Abolishment of Nazi Synthetic-Oil Facilities for Peace

NEW YORK.—Elimination of Germany's synthetic-oil resources heads a four-point program proposed by the presidents of five national engineering societies to remove that country's ability to make war in the future. The societies' recommendations, under consideration for months, were made public in a joint statement last week, following the proposal of Secretary of the Treasury Henry Morgenthau, Jr., that control of postwar Germany be accomplished by destruction of her industrial plant and making her an agricultural nation. The Morgenthau suggestion was described by the engineers as economically unsound and containing the seeds of a new war.

The program recommended by the engineering societies for control of industry in the reich follows:

"1. Eliminate all synthetic-oil capacity and prohibit the reconstruction of plants and the importation of oil beyond normal peacetime inventories.

"2. Eliminate 75 per cent of Germany's synthetic nitrogen plant capacity and prohibit reconstruction of plants and all importation of nitrogen compounds.

"3. Eliminate 50 per cent of Germany's steel-making capacity in those categories of plants which are most capable of producing essential war materials, such as heavy-forging, electrolytic and high-alloy steels. Manganese, chromium, nickel and tungsten are practically nonexistent in Germany. Also prohibit importation of iron ore, flux material, steel and steel products beyond normal peacetime inventories.

"4. Eliminate aircraft plants and equipment. Aluminum and magnesium are the raw material required for airplane manufacture. There are no important bauxite deposits in Germany. Importation should be prohibited. Aluminum and aluminum plants should be destroyed and importation of aluminum ingots beyond prewar peacetime needs be prohibited."

The statement was signed by Malcolm Pirnie, American Society of Civil Engineers; Chester A. Fulton, American Institute of Mining and Metallurgical Engineers; Robert M. Gates, American Society of Mechanical Engineers; Charles A. Powel, American Institute of Electrical Engineers, and George G. Brown, American Institute of Chemical Engineers.

The 75,000 members of these organizations provided much of the technical guidance in this country's mobilization for war.

"Discriminating between peace and war economy," says the joint statement, "there are at least six industries which are the most essential for war purposes, and the least essential for a peacetime economy. They are synthetic gasoline, for which there is no economical peacetime use; manufacture of explosives; airplane production; use of aluminum and magnesium; high alloy and electrolytic steels, and nitrogen fixation, all of which must be vastly expanded to prepare for war. The labor employed by all these six industries in peacetime is less than 2 per cent of the total German force.

"Fifty or 60 per cent of the German oil and gasoline supplies has come from synthetic coal-distillation plants scattered throughout Germany. A third of her requirements have been derived from the Ploesti oil field in Rumania. The synthetic plants produce inferior products at a cost about four times world prices. Their operation has required government subsidy. These war plants should be demolished. Eighty per cent of nitrogen is produced synthetically from the air, but it could not be produced without reconstruction of special plants or without Chilean nitrates which Germany must import. Germany could not make steel, produce oil products or make munitions of war without imports of bulky, easy-to-police materials.

"The essence of this program is to remove from Germany the plant and source materials essential for war purposes, but to do it with the least disturbance to the normal economy of western Europe."

Venezuelan Oil Output Rises to All-Time Record

NEW YORK.—Both crude-oil production and exploratory activities are increasing in South America, trade reports indicate. Venezuelan output is reported to be approaching the 900,000-bbl. daily mark, compared with between 600,000 and 650,000 bbl. daily earlier this year. Current output represents a new all-time record, it is believed.

Thirty-eight exploration parties are now said to be in operation in Colombia including the Oriente region where considerable leasing is reported to have taken place during the past year.

In the trans-Andean district of Peru, the Shell group is reported to be contemplating exploration activities in the Madre de Dios region and to have made a tentative location for a wildcat test well near the bank of the Orellava River about 50 miles from Contamana. Eighty-six tons of equipment is said to have already been delivered to the site.

Ecuadorian oil output is reported to have been running in excess of the 1943 rate this year. In the first quarter output is reported at 638,916 bbl., up slightly compared with the corresponding period of 1943.

Indications point to increased activity in the area east of the Andes in Peru, Ecuador and Colombia in the postwar period as materials become available for shipment to this extensive region. Present work being done is regarded as preliminary to lay the groundwork for larger development expected at that time.

Norman Wells Now Second Largest Field in Canada

CALGARY, Alta. — The Norman Wells field now ranks as second largest oil field in Canada, its daily output of 2,200 to 3,700 bbl. comparing with about 23,000 bbl. from Turner Valley, and some 1,400 bbl. from other Alberta oil areas, according to The Oil Bulletin. Crude deliveries to the Canol refinery at Whitehorse, 550 miles distant, began last May, and they are understood to be running between 3,500 and 4,000 bbl. daily, with the Canol pipe line operating at capacity. Norman Wells has over 50 wells producing. Potential production is believed to be twice the current pipe-line runs.

Norman Wells produced 111,124 bbl. of crude during June 1944, raising production for the first half of the year to 569,784 bbl., the Dominion Bureau of Statistics reported. This compares with 17,402 bbl. in June 1943 and a total of 89,929 bbl. in the first half of 1943. Production in May 1944 was 104,774 bbl. and in April 1944 was 114,857. The field, along the Mackenzie River, just south of the Arctic Circle, was discovered by Imperial Oil, Ltd., in 1919. It has been developed during the past 2 years by Imperial under the U. S. Army's Canol Project.

Production in July skidded to 68,384 bbl., according to figures released by the Dominion Bureau of Statistics. The 7-month production figure for Normal Wells was 638,168 bbl. compared with 106,003 bbl. for the same period in 1943.

I.P.A.A. Directors To Discuss Prices And Oil Agreement

DALLAS. — Major issues facing the independent oil producer such as a national oil policy, crude-oil price, negotiations with the English on oil in international trade, segregation of earnings, and many others, will be discussed at the directors' meeting of the Independent Petroleum Association of America which convenes here October 9, 10 and 11.

This strictly business session is in lieu of the association's annual membership meeting with the change in the form of meetings being made on the request of the Office of Defense Transportation and in furtherance of the war effort.

One topic due to receive special attention at the meeting is that of a national oil policy. In recent discussions concerning this subject, Ralph T. Zook, president of I.P.A.A., has pointed out that the adoption of a policy of importation for a major source of our oil supply would effectively freeze domestic reserves at their present levels.

"Discovery effort would cease if the oil operators had no assurance of being able to sell the oil they produce," Zook has pointed out.

He has said the surest method of restoring and enlarging reserves and assure a healthy domestic petroleum industry is to increase the price of crude oil.

Committee meetings to discuss the problems confronting the independent producer will be held Monday and Tuesday. Adoption of resolutions and the election of members of the executive committee and officers for the year 1944-45 will be held Wednesday morning. Following a meeting of the executive committee Wednesday afternoon the 3-day meeting will be adjourned.

Representatives from more than 16 oil-producing states are expected to attend the directors' meeting.

Secret British Field Yielding 1,800 Bbl. Daily

LONDON.—Great Britain is getting 700,000 bbl. of oil annually from wells in an undisclosed area within her own borders, it was revealed by the government last week. The location is not to be announced until Germany has been defeated. There are 238 wells in the field. Derricks are used for drilling only and then removed. The site of a well is leveled and sodded, and a small pump is installed. Underground pipe lines move the oil to a railroad siding, from where it is shipped to refineries by tank cars.

Pumps are painted green, to match the landscape, and they are driven by electric motors. "Milk and oil from the same field" is the slogan. The oil is said to compare with Pennsylvania crude in quality. The total volume produced thus far is 2,100,000 bbl. The existence of this supply, though small in contrast with Britain's 1938 oil imports of 113,600,000 bbl., was comforting when the U-boat menace was at its peak.

The wartime development of the field from 1,666 bbl. a month when the war began to 56,450 now is the result of prospecting and drilling since the closing stages of the last war.

Special Study Urged of Alcohol-Fuel Outlook

WASHINGTON. — Creation of a special committee to study the use of grain alcohol as an automobile fuel is asked in a report filed by the special Senate committee investigating the utilization of farm crops.

The committee, headed by Sen. Guy M. Gillette of Iowa, was created to investigate the use of alcohol in the synthetic-rubber industry, and is extending its investigations into postwar uses for alcohol made from farm crops.

An interim report submitted to the Senate last week suggested that the president appoint a group of impartial scientists, similar to the Baruch committee which studied the synthetic-rubber program, to report on the prospects for fuel use of alcohol.

The Gillette committee contended that after the war the Government will be able to produce alcohol at almost no expense, since it will already own the plants built to produce alcohol for synthetic rubber and will also be obligated to purchase large quantities of surplus grain in order to support farm prices.

Civilian Gasoline Supplies Are Near Minimum 'Working' Levels

Stockpile Barely Sufficient to Cushion Reasonable Fluctuations Between Production and Consumption

WASHINGTON. — The nation's stockpile of civilian gasoline, near minimum working levels, is barely sufficient to take care of any reasonable fluctuations between demand and refinery production during the remainder of this year, Petroleum Administrator Harold L. Ickes said last week.

Commenting on the present stock position, Mr. Ickes said:

"Civilian gasoline demand for the first 2 weeks in September exceeded refinery production by 86,000 bbl. daily. However, peak seasonal demands are diminishing and a slight temporary reduction in military demand should result in maintaining stocks near the present level of approximately 40,000,000 bbl.

"Only about half of our total gasoline stocks in the United States is civilian grade gasoline. The other half consists of unfinished gasoline, aviation and special military grades, butadiene, toluene, solvents, and naphthas. Total gasoline stocks in the United States were 78,372,000 bbl. on September 23, as compared with 79,963,000 bbl. for the same time in 1941 when almost 90 per cent of the total were civilian grades."

Deputy Petroleum Administrator Ralph K. Davies said that refinery production of civilian grade gasoline averaged 1,225,900 bbl. daily for the first 8 months of this year. A slight increase was recorded during the first 2 weeks of September, when refinery production averaged 1,231,800 bbl. daily. Demand for civilian gasoline at refineries and terminals in the United States during the last 2 weeks averaged 1,317,800 bbl. daily, exceeding production by 86,000 bbl. a day.

"Demand for civilian gasoline during the last quarter of 1944 is estimated to average 1,223,000 bbl. daily and refinery production of this product is estimated to be approximately 1,250,000 bbl. daily," Davies said. "Heavy drafts on stocks should gradually diminish throughout the month of September and stocks will be built up to take care of the heavy farm demand during the spring of 1945."

CIVILIAN GRADE PETROLEUM STOCKS
(Thousands of barrels)

PAW districts—	Motor fuel		Kerosene		Distillate fuel oil		Residual fuel oil		Crude oil	
	Sept. 16	Sept. 9	Sept. 16	Sept. 9	Sept. 16	Sept. 9	Sept. 16	Sept. 9	Sept. 16	Sept. 9
1	7,187	7,271	6,080	5,983	12,848	12,751	11,340	10,840	15,928	15,807
2	17,083	17,436	3,451	3,320	8,351	8,454	5,772	5,734	72,428	71,437
3	10,670	11,181	3,683	3,466	11,140	10,926	9,868	9,333	104,678	104,707
4	1,250	1,293	97	96	395	376	646	643	7,079	7,344
5	3,921	3,717	413	424	10,822	10,546	28,342	27,994	28,148	27,519
Total	40,111	40,898	13,724	13,289	43,556	43,083	55,968	54,544	228,281	226,814

Ickes Denies That "A" Cards Could Be Doubled

WASHINGTON.—Secretary of the Interior Harold L. Ickes last week denied sharply that the nation's "A" cards could be doubled, as suggested by Sen. Clyde M. Reed of Kansas. During the first 2 weeks in September, Ickes said, civilian consumption of gasoline ran 86,000 bbl. a day above refinery production and half the gasoline stocks, to which Reed referred, belong to the armed forces.

Senator Reed had written to Ickes, with copies to Chester Bowles, Office of Price Administration, and J. Monroe Johnson, Office of Defense Transportation, charging that "information from sources within the petroleum industry" showed production of crude, natural gasoline and imports averaging 5,200,000 bbl. daily for September, against the 1943 average of 4,400,000 bbl. daily. With an excess of 250,000 bbl. a day, Reed said, "A" card drivers should have more gasoline.

While the deficit of 86,000 bbl. is not serious, Ickes said, refinery production won't catch up with consumption so long as the war goes on in Europe. After the fall of Germany, and following a period of readjustment, gasoline supplies should be easier, he indicated.

Referring to Reed's charges of excess stockpiles of gasoline, Ickes reported that on September 6, total gasoline in stocks was 78,726,000 bbl., of which 40,111,000 was civilian grade. On September 18, 1943, stocks of 71,299,000 bbl. existed, of which 38,400,000 were of civilian grades.

"We are running every refinery we can to capacity," Ickes said, "but we can't predict Army and Navy demands."

Questioned about division of supplies between civilian passenger car drivers and commercial users, Deputy Petroleum Administrator Ralph K. Davies said PAW is entirely satisfied with ODT's division.

Fuel oil, Ickes reported, will be somewhat more plentiful this year, as a result of increased production. For the week of September 23, 1944, supplies were up about 300,000 bbl., with a total of 13,143,000 bbl. Last year, fuel-oil stocks for the comparable week were 8,700,000 bbl., but earlier filling of civilian tanks accounts for some of the difference.

Pirinc Issues Booklet On Foreign Oil Policy

"World Oil Fact and Policy," a booklet of 80 pages prepared by Petroleum Industry Research Foundation, Inc., (Pirinc), undertakes to present a realistic analysis of the Anglo-American oil pact and of the situation with which it deals. It is described as "an attempt to report and record the settled thinking of the petroleum industry," To whatever extent the argument embodies a point of view or champions a position, they are the industry's, not Pirinc's, an introductory statement says.

William R. Boyd, Jr., president of American Petroleum Institute and chairman of Petroleum Industry War Council, points out in a foreword that the average oil man's time is so limited as to preclude his making a personal analysis of some of the questions that loom so large today, with the result that he is forced into a position where he must either form superficial opinions of his own or else rely upon the careful analysis of a group of unbaised, objective-minded specialists. The booklet is designed to fill the need thus indicated.

THIS WEEK

PRODUCTION—Following a minor recession the week before, daily crude output leaps to new high of 4,758,200 bbl. . . . Tops record of week ended September 16 by 16,100 bbl. . . . ¶A company protests against paying Texas state production tax on value added by stripper-well subsidy. . . . Only $4.97 involved, but provides basis for court test. . . . ¶West Edmond field now has 170 producing wells. . . .

FOREIGN—Mexican Senate ratifies oil settlement with United States. . . . Mexico to pay $23,995,991 to five expropriated companies. . . . Also 3 per cent interest from date of expropriation in 1938. . . . British interests, three times as large as this country's, reject Mexico's proposal. . . . ¶Venezuelan production nearing 900,000-bbl.-daily level. . . . ¶Romanian petroleum facilities to be rehabilitated in near future, returned intact to Allied prewar owners. . . .

WASHINGTON—Pointing to reduction of PAW activities, key men, especially in its production department, reported arranging to return to former jobs or seeking employment in other government agencies. . . . ¶Problems of independent operators receive final hearing before House Small Business Committee. . . . Prompt report promised. . . .

DRILLING—PAW projects 27,000-well program for 1945, needed to meet production requirements. . . . ¶New deep-drilling record for California, 15,026 ft., established. . . . Operation still under way and may exceed world record of 15,279 ft. in Texas. . . . California's previous record, set in 1938, was 15,004 ft. . . . ¶Deepest test in Florida, Humble wildcat in Collier County, now below 13,430 ft. . . . ¶Week's completions total 488. . . . This is 26 above previous week's, but 10 below 1944 high.

NATURAL GAS—FPC to investigate reserves, to ascertain probable life, future utilization, nature of competition with other fuels. . . . Industrial and labor interests urge restriction of uses for which gas may be sold. . . . ¶National Conference of Petroleum Regulatory Authorities protests that such inquiries are state, not federal, function. . . . ¶Winter needs of Memphis can't be met unless pipe-line facilities to Louisiana are expanded, FPC is told. . . .

SYNTHETICS—Tire manufacture permanent industry of Southwest, regardless of source of raw materials, executive of rubber company says. . . . Oklahoma factory, costing $6,000,000, in operation by end of year, to make tires mainly of synthetic rubber. . . . ¶Senator Gillette accuses oil interests of trying to squeeze out farmer and establish a "postwar synthetic-rubber monopoly." . . . Special committee urged to study alcohol-gasoline blend. . . .

TRANSPORTATION—Atlantic Coast hurricane damaged tankers, with result substantial movement switched to tank cars. . . . ¶Easing of ODT restrictions makes more tank cars available for short hauls. . . . Daily tank-car movement of oil into Middle West rose from 146,000 bbl. April 1 to 161,000 August 26. . . . In same period tank-car traffic to East Coast dropped from 645,000 bbl. to 607,000. . . . That to West Coast rose from 37,000 bbl. to 115,000. . . . ¶More tank trucks in service than ever, especially to District 5 and intradistrict hauls. . . . ¶Cleveland Petroleum Dealers Association urges abolition rationing of gasoline for trucks. . . . Would curtail black-market operations described as "billion-dollar racket." . . .

—International News Photo.

Geoffry Lloyd and Sir William Frazer inspect one of the 280 producing wells developed in Great Britain's secret oil field since the war started. Daily production is around 2,000 bbl.

New Depth Record Established for California; Well Still Drilling

LOS ANGELES.—Eclipsing a record that has stood since 1938, Standard Oil Co. of California on September 29, 1944, set a new deep drilling record for the state of 15,026 ft. in 20-13 Kern County Land, an exploratory well in the Coles Levee field of Kern County. Drilling operations are still under way and the test may reach or exceed the world's deep drilling record of 15,279 ft. established in Pecos County, Texas, although much depends upon whether the formation justifies the necessary drilling.

Standard's deep well was undertaken in search of formations that have been found productive in the eastern rim of the San Joaquin Valley, notably the Rio Bravo and Vedder sands of Miocene age. To date the hole has shown some encouragement but nothing in the way of production. With the hole at its present depth, it is quite likely Standard will continue drilling to make a conclusive test of the Miocene sediments and to reach the Eocene if at all possible.

The previous deep drilling record in the state of 15,004 ft. was established by Continental Oil Co. in the Wasco field of Kern County but the well was finished above this depth. Continental had an oil sand in the bottom of the hole but it appeared very tight and lacked favorable porosities and permeabilities. At a later date this 15,004-ft. zone may be tested.

Progress has been very slow in Standard's Coles Levee well due to extremely hard formations where 25 or 30 ft. a week represented normal drilling. Indicative of the depth reached is the fact that it takes the crews one complete tour of 8 hours to come out of the hole and go back in with a bit when a change is necessary.

General Pattern Outlined for Disposition of Oil War Plants

WASHINGTON.—The Surplus War Property bill went to the White House recently, after a stormy career in the House and Senate conference committee, carrying strict rules on disposal of government-owned petroleum properties.

Within 3 months after enactment of the law, the three-man Surplus War Property Board is directed to submit a report to Congress on properties costing $5,000,000 and over including synthetic-rubber plants and facilities, aviation-gasoline plants and facilities, pipe lines and facilities used in transporting oil, and patents, processes, techniques except those necessary in operating the plants and facilities covered in the provision.

This report will cover description, cost and location, the economic problems created by disposition, and will set forth a plan for care, handling, disposition and use of the property. If it is not possible for the board to submit a complete report, an interim report is required. No such properties can be sold until at least 30 days after such a report has been made while Congress is in session, although the board is empowered to lease them for a term of 5 years or less. Surplus equipment not needed to operate plants or pipe lines can be sold without congressional approval.

A provision which would have withheld mineral rights of surplus lands for government use was knocked out in committee.

Smaller War Plants Corp. was given authority to buy and sell surpluses, and make and guarantee loans for purchase of surpluses. SWPC has announced its intention to equip the nation's small businesses with the best machinery possible through acquisition of surplus goods, a plan which may have some value to smaller oil operators.

Soviet Kuban Fields to Resume Production

WASHINGTON. — The Kuban oil area of the Soviet Union in which all installations were destroyed is being restored and is expected to be in production by the middle of 1945, according to reports reaching the Department of Commerce.

Before the war the district yielded 3,000,000 tons of petroleum annually and the industry provided employment for 20,000 workers. The installations were so thoroughly destroyed that the Germans were unable to obtain any petroleum during their occupation.

Crude petroleum from the Kuban area, with the exception of the Taman region, is reported to contain 52 per cent light fractions and yield the highest percentage of gasoline of any Soviet crude.

Price Formula for Eastern States Revised by PAW

WASHINGTON. — Equitable distribution of oil supplies to East Coast consumers is expected to result from revisions in the price formula on products sold on assignment or reassignment in that area. This action of Petroleum Administration for War, effective September 28, was taken by amending Directive 59.

When an assignment is made to a supplier in Zone 6 by an assignor who normally used tanker transportation, the supplier will now use the same price formula that prevailed for sales in the other zones in District 1. (Where the supplier or assignor has no tanker price formula, ceiling prices have been established by Office of Price Administration's Order 50 under Maximum Price Regulation 88, also effective September 28.) Assignment prices in Zone 6 formerly were determined by negotiation between the assignee and assignor.

When a reassignment is made anywhere in District 1, suppliers will now use a specific formula included in the text of the order, to arrive at the reassignment price. Reassignment prices formerly were determined by negotiation.

A new uniform method is provided for calculating the items of transportation tax to be included in the assignment formula. The previous method had become controversial as a result of the various interpretations placed on the transportation-tax item.

Steel Allocation to Oil Industry Is Increased

WASHINGTON. — The War Production Board has allocated the petroleum industry an additional 20,000 tons of steel for use during the fourth quarter of this year, it was announced October 2 by the Petroleum Administration for War.

This amount was cut off from PAW's original allocation pending a survey of inventories of oil operators, but with the understanding that it would be restored if the survey showed an actual need for this steel to conduct the industry's scheduled operations.

27,000-Well Program Projected To Meet 1945 Requirements

WASHINGTON.—The oil industry is scheduled to drill at least 27,000 new wells in 1945 in order to maintain production of crude at a rate sufficient to meet estimated military demands for petroleum products next year, the Petroleum Administration for War announced this week.

At least 5,000 of these should be exploratory wells, it is felt. The total is 3,000 more than the 1944 program of 24,000 wells, a goal which will just barely be reached because of manpower and materials difficulties. During the first half of this year the industry was 5 per cent behind its drilling schedule, but the drilling rate has increased in recent months, and sufficient materials have been allotted to achieve the 24,000 new wells by the end of the year.

Military estimates given to PAW indicate that production will have to be maintained at its present record rate even though the war in Europe ends soon, and PAW believes that more than 27,000 new wells would be desirable but that materials and manpower may not be available for a higher number.

Contractors Urged to Work Against British-American Petroleum Treaty

by Neil Williams

FORT WORTH.—Members of the American Association of Oilwell Drilling Contractors in their fourth annual meeting here October 3 and 4 were called upon by A. H. Rowan, president for the past year, to protest vigorously ratification by the United States Senate of the proposed Anglo-American oil agreement.

Rowan made the plea in his opening presidential address in which he branded ratification of the treaty as "contrary to the best interests of the drilling industry," pointing out that ratification of the treaty would give Congress power to regulate and allocate production for the duration of the treaty and establish continued and more complete control over the oil industry of this country. He expressed the opinion that "such federal regulation would be the downfall and destruction of the independent drilling contractor."

"I believe," he said, "that regulation of the oil industry by the several states has proved to be in the public interest, and that federal regulation can not improve upon conditions as they existed before the war."

Rowan also praised the accomplishment of the drilling industry in greatly expanding its operations in an effort to meet the schedule of 24,000 wells for the current year as set up by PAW. The number of rotary drilling operations is now at an all-time high, he stated, listing the number of rotary rigs in operations at 1,700 and cable tools at 1,000.

A three-point program for the association to undertake was outlined. It covers (1) better safety regulations for the protection of employes, (2) improved relations between employes and employers, and (3) improved technique in drilling practices.

The new officers elected October 3 are: President, Howard P. Holmes, Two States Drilling Co., Dallas; vice president at large, William P. Payne, Big Chief Drilling Co., Oklahoma City; vice president for West Texas and New Mexico, J. E. Warren, Carl B. King Drilling Co., Midland, Tex.; Gulf Coast, H. E. Hamilton, Houston; California, Ralph W. Marshall, Drilling and Exploration Co., Los Angeles; Illinois, Michigan, Indiana and Kentucky, Will I. Lewis, Mount Vernon, Ill.; vice president for cable tools, James D. Leonard, Leonard Drilling Co., Mount Pleasant, Mich.; vice president for well servicing, K. B. Knox, Houston; treasurer, H. W. Bass, Bass Drilling Co., Dallas. Brad Mills was reelected executive secretary.

Says Oil Interests Trying To Squeeze Out Farmer

WASHINGTON.—Oil interests are trying to "squeeze out" the farmer and establish a postwar synthetic-rubber monopoly by diverting premium-grade gasoline components to synthetic-rubber production at the expense of civilian supplies of such gasoline and, possibly, at the expense of high-octane aviation gasoline for the armed forces, says Sen. Guy M. Gillette, of Iowa, in a statement given out this week.

"I am advised," says Gillette, "that plans have already been made, secretly, to reduce the share of grain alcohol in the synthetic-rubber program and increase the oil industry's share, despite the fact that alcohol production is now running in excess of all requirements and bumper grain crops are in prospect. . . . The only reason for such diversion appears to be the oil industry's alarm at the success of the alcohol-rubber program, which, according to the last report of the rubber director, has accounted for the greatest tonnage of synthetic rubber produced to date, and which has decided advantages from the standpoints of plant investment, costs of operations, and simplicity. Oil interests are apparently taking advantage of the solitary argument against alcohol rubber — the present abnormally high cost of grain—to squeeze out alcohol and install themselves as synthetic-rubber monopolists, before normal grain prices return and this argument is lost to them."

Mexico Ratifies Oil Settlement With U.S.

MEXICO CITY. — The settlement between the United States and Mexico of questions arising from the expropriation of oil companies in this country in 1938 was ratified last week by the Mexico Senate. The settlement provides for payment by the Mexican government of $23,995,991 to five companies, the largest of which is Standard Oil Co. (New Jersey). Besides this, 3 per cent is to be paid from the date of expropriation.

The first installment of one-third was paid in 1943 subject to ratification of the agreement by Mexico. The balance will be paid in five annual installments. Sinclair interests already had settled separately for $8,500,000 and Cities Service for $1,100,000.

The British interests, nearly three times as great as those of the United States companies, rejected Mexico's proposal. Under the agreement, all obligations of the United States companies involved are canceled.

The senate foreign relations committee, headed by Emilio Araujo and Pedro Tello Andrueza, reported: "So is closed with honor to our country the count of this problem, and the sums to be paid are within the economic possibilities of the government, and will constitute for the future no hardship."

With the senate action, ratification is completed.

States Urged to Regain Control of Oil Affairs

OKLAHOMA CITY. — Obviously impressed by the fact that they were taking part in a meeting of great historic importance, the official representatives of the oil-producing states to the Interstate Oil Compact Commission met with several hundred oil industry representatives this week to work out a program and the policies necessary to define the relative position and authority of the individual states, the federal Government and foreign governments in handling petroleum problems in the postwar era.

Conscious of a well-done prewar job of conservation achieved over a period of many years, the states displayed no disposition to surrender permanently the powers of regulation they deemed inherent in their sovereignty. Their position was keynoted by Beauford H. Jester, chairman, Railroad Commission of Texas, who declared that if the states and the Interstate Compact Commission did not immediately take steps to insure and secure complete state regulation and control of oil and gas at the end of the war, the commission would be a mere shell which would not endure.

Postwar Danger Cited

He stated that there was cause for the belief that federal control of oil and gas would be advocated in the postwar period by high officials in Washington, pointing out that the proposed Petroleum Reserves Corp., the proposed financing of the Saudi-Arabian pipe line, and most recently the proposed Anglo-American oil agreement were specific projects aimed directly at circumventing state authority. To prevent centralized control, Jester called on the leaders of the petroleum industry, the members of the Compact Commission, the state regulatory commissions and the people of the oil-producing states to join in demanding termination of federal power after the necessities of wartime coordination end, and to see that state conservation, regulation and control of oil and gas was firmly established.

Warning, however, that if the states were to regulate and control matters of conservation, they must be ready, willing and able to step in and do an efficient job the day peace comes and war emergencies go, Jester called on the states to put their own houses in order. He reiterated and endorsed the admonition given members of the Compact Commission at the New Orleans meeting in April by the chairman, Gov. Andrew F. Schoeppel, of Kansas: "States which already have conservation laws and properly constituted authorities administering those laws should immediately begin to take a careful inventory of their situation. They should determine whether their statutes are adequate, whether their rules and regulations are proper and whether their enforcement methods are sufficient. Statutory changes should be recommended and urged on their legislatures. Just because we had something that 'got by' 2 or 3 years ago doesn't mean that we are ready to meet the challenge that victory must bring."

Jester said that states which have no conservation laws should promptly provide such laws as will protect their reserves and prevent any intrusion of federal control.

The international problem and its bearing on the local problems was discussed by Joseph E. Pogue, vice president, the Chase National Bank of New York. He pointed out that because our states are sovereign in respect to laws governing the soil, subsoil and petroleum, the states are in effect "nations" and the federal Government a coordinating force. Pogue stated that problems of oil in the international field can well be considered in the light of the experience hitherto gained in the United States.

From the parallels of experience in this country, he stated that administrative procedures for the coordination of the interests of the state and industry do not emerge perfected in the initial effort, but evolve by adaptation. In a brief discussion of the international situation and probable postwar trends, Pogue indicated his belief that some form of international agreement on oil was a necessity for the welfare of the United States as a whole, and for the individual oil producers, as well as for the rest of the world. The alternative would be a series of dislocations, discord and potential surprises, both economic and political in the international field as well as at home.

Oil Treaty Analyzed

Some of the criticisms of a proposed international agreement were sound, others were based on erroneous conceptions of what was proposed, and still others are the result of too wide a choice of interpretations, he said. Pogue suggested that the language of the proposed Anglo-American treaty should be clarified. Specifically, he suggested amendments to specify that the engagements do not invade the rights of states, that the provisions have merely to do with holdings by American and British nationals abroad, that the findings of the proposed International Petroleum Commission shall be purely advisory, and provisions should be made for adequate industry representation. He suggested that the Interstate Oil Compact Commission should promote enabling clarifications by the United States Senate.

What Others Say

Long-Range Project

Dear Sirs:

Our activities in the Hugoton area have been given a great deal more publicity than they warrant. We have assembled a block of acreage in that field hoping to eventually utilize it in a Fischer-Tropsch plant. However, such a project is a very large one and much remains to be done in the way of experimental work, financing, etc., before it could be undertaken.

Our idea is that within several years, providing the crude price structure is firm that we might be in a position to go ahead. It is definitely a long-range proposition and is nothing to get excited about for the present.

Yours sincerely,

FRED C. KOCH
Wichita, Kans.

Zaba Series Tops

Dear Sirs:

. . . We have checked with our engineering department and they tell us that, in their opinion, the Zaba series is one of the best of its kind ever published. They have clipped and bound the entire series, and when an engineering department is this interested, you can take it for granted the articles were of more than ordinary interest and value.

Very truly yours,

SAM T. KELLER
Parkersburg, W. Va.

A Modest Bow

Paul Buthod,
Tulsa
Dear sir:

It is with considerable interest that I have been following the series of articles on heat transfer calculations written by B. W. Whiteley and yourself currently running in The Oil and Gas Journal. The articles are well presented and very practical. Many of the charts are not available elsewhere and on several occasions they have saved me considerable time and effort.

Sincerely yours,

FRANCIS D. HOUGHTON,
H. & H. Consulting Service,
Wilmington, Del.

FOUNDED IN 1910

BY PATRICK C. BOYLE

the OIL AND GAS JOURNAL

Reconversion—An Industry Problem

WASHINGTON.—After listening to a day of explanations by several government officials most familiar with the subject, two thoughts in regard to postwar planning in the petroleum industry are confirmed: First, a workable plan for reconversion, including the disposal of surplus oil products, is primarily an industry problem; second, the job ahead in the oil business is relatively simple compared to that which faces many other industries.

Those in the oil business who feel that in the near future an existing arm of the Government or a newly created agency will announce a master plan which they can readily apply to the purchase of a 100-octane plant, a pipe line or some other facility which they have been operating are certain to be disappointed. So are those who expect prompt disposal of excess petroleum products in military storage tanks when the war emergency ends.

Upon all industry devolved at the war's outset the task of finding ways and means of providing the materials and capital goods which represented the difference between victory and defeat. The managements responsible for this outstanding production accomplishment of all history have an equally important duty, starting now, of inaugurating reconversion plans which will contribute signally to a workable peacetime economy.

The responsibilities of the oil business at this critical period are clear. So far as the disposal of excess finished products is concerned the problems ahead are not particularly difficult. While the burden of excess consumer goods will hang over the markets of some industries for months, perhaps years, after victory, total oil products in the hands of the military can be measured in days' supplies for normal civilian outlets.

The logical procedure is for large and small operators, acting alone or collectively as circumstances may require, to be in a position to absorb these excess supplies through their own market channels as they become available. Temporary adjustments in operations will be necessary.

In regard to war-plant, transportation, and storage facilities in which the Government and the oil business now have an investment of approximately $2,000,000,000, operators should lose no time in working out a reconversion program satisfactory to those who have the responsibility of disposing of excess war property. Primarily, officials are interested in converting war operations with a minimum of unemployment. The oil industry is particularly fortunate in this regard.

A basic governmental policy provides that war facilities shall not be disposed of at prices which will give purchasers advantages over competitors in regard to postwar operating costs. At the same time officials are aware that buyers in most cases will have to make substantial investments in converting war equipment to postwar needs, and they don't expect operators to pay in excess of replacement costs regardless of the war expenditures.

If the petroleum industry does nothing and decides to wait and see what happens in this initial postwar problem, it will be falling down in an obligation as vital as is the support of the war program. It will be playing into the hands of a minority in key Washington positions who are hopeful that the tasks of reconversion will result in a confusion so great that they will be able to fasten war controls upon industry permanently.

Three California Blowouts Occur Within Two Weeks

by L. P. Stockman

THE blowout several days ago of Signal Oil & Gas Co. 129-2 State Tideland Permit, an outpost in the Elwood field of Santa Barbara County, is one of three such incidents in widely separated California areas within a period of 2 weeks. Two of the blowouts caused complete loss of holes and equipment.

The Signal well was brought under control early this week by an asbestos-clad crew which made a "hot tap" to free the frozen master gate valve.

The performance of Signal's 129-2 is significant because it tends to indicate a new accumulation of oil and gas west of the Elwood field. The oil and gas which ignited at the mouth of the well is coming from Vaqueros sand of lower Miocene age. No production has yet been developed north of the Lavigia fault. Signal's first well finished on Permit 129 was only good for 200 bbl. daily on gas lift. This is important because 129-2, the blowout well, is west of the first small producer and farther removed from production in the Elwood field. No data have been released on the amount of deviation in these two wells but, if deflected 1,000 ft. southwestward, the bottom of the hole would be located at a point where it would intercept the projected axis of the Elwood field. It is quite likely Signal's next well will be located farther to the west and should determine the importance of this accumulation. Elwood is about 11 miles west of Santa Barbara and is an anticlinal structure with several hundred feet of closure. The Lavigia fault, which roughly parallels the axis of the Elwood anticline, limits production to the north. More than half of the productive acreage in this field is submerged beneath the ocean and has been developed from several drilling piers both by vertical and deflected holes.

Signal Oil & Gas Co. 129-2 State, an outpost well west of the Elwood field. Plans to dig a 125-ft. tunnel from the cliffside were abandoned when workers succeeded in closing the master gate

Kirby Hills

In the Kirby Hills district of Solano County, Shell Oil Co., Inc., 1 Lambie, 25-4n-1w, blew out about 2 weeks ago while the crew was coming out of the hole and blew wild for about a week. This wildcat blew in doing about 25,000,000 cu. ft. of dry gas daily but did not catch fire so control work was not unusually difficult. The hole and a major part of the drilling equipment were lost, however, and the hole was filled with cement. Base of the Markley sand was cored in this wildcat at 1,550 ft. and top of the Emigh shale was found at 1,856 ft. The Green sand was cored at 2,061 ft. and the Emigh sand was at 2,087 ft. There was no pipe in the hole when this wildcat began blowing and although the bit was down 2,617 ft. the gas may have been coming from the Emigh sand which is productive of dry gas in this general area. The implication is that Shell has probably found a new productive area in the Kirby Hills. Derrick has been erected for a second test which will be drilled east of 1 Lambie.

Tejon District

In the Tejon Ranch district in southern San Joaquin Valley, Reserve Oil & Gas Co. 33-7, 33-11n-19w, blew out several days ago following a formation test for water shutoff at 2,610 ft. and ran wild for 5 days before being brought under control. Following conclusion of the formation test, the crew had pulled all but 13 doubles when the well began blowing and in 5 or 6 seconds the drill pipe had been cleared from the hole. This outpost in the Tejon field showed a daily blow of from 15,000,000 cu. ft. to 20,000,000 cu. ft. of gas with an occasional spray of light oil but did not catch fire. The crew has reentered the well for a cleanout job and may be able to save the hole which was down 2,705 ft. at the time of the blowout.

At Huntington Beach a few weeks ago, Standard Oil Co. of California had a well crater at two points about

400 ft. from a drilling well and an old water well 300 ft. away in the other direction began blowing oil, gas and water. It was a spectacular display for 3 days until controlled. The gas was found to have originated in Standard 66-A Huntington, a drilling well at 5,315 ft., but with an effective depth of 4,995 ft. Seven-inch casing was cemented at 4,704 ft. and cemented again through perforations at 1,055 ft. Gas from the lower part of the hole apparently bypassed the shoe of the 7-in. pipe.

Gas channeled away from the drilling well and resulted in two craters each with diameters of 60 ft. and also reached the old water well which began blowing simultaneously. In order to correct the situation, the 7-in. was perforated at 475 ft. and 1,375 sacks of cement were pumped in. The well was cemented in six stages and now has been plugged to 1,030 ft. preparatory to being converted into a water well. The difficulty experienced in this well is one of the penalties of dispensing with the usual water string, a wartime, steel-conservation measure. The only casing in this well at the time of the blowout was 48 ft. of conductor pipe and the string of 7-in. that was being cemented.

Commission to Investigate Natural-Gas Reserves

WASHINGTON. — Natural-gas reserves of the United States are to be investigated by Federal Power Commission with a view of ascertaining their probable life and future utilization and the character of competition between natural gas and other fuels.

"The need for a comprehensive fact-finding survey of this exhaustible resource has been recognized for several years, not only by the commission, but also by members of Congress, congressional committees, state and federal conservation agencies, state regulatory agencies and representatives of industry and labor," the commission said in a statement announcing the investigation.

"Representatives of gas-producing states have advanced divergent contentions with respect to the exportation of natural gas from their states for consumption in areas where other energy resources are available. The economic, sociological and technological aspects of fuel competition have been presented to us by representatives of coal, labor, railroad and other interests. These groups have strongly urged the commission either to deny certain requested certificates of convenience and necessity for new pipe lines, or to attach restrictions which would substantially limit the uses for which natural gas might be sold from the new facilities.

"On the other hand, representatives of natural-gas companies have appeared before us to emphasize the investments made to supply gas to markets which include domestic, commercial, industrial, and other customers. They have contended that curtailment of supply to industrial customers would substantially impair ability to render service to other classes of consumers at reasonable rates. They have also contended that new or additional sources of supply are necessary to maintain adequate service in areas where natural-gas supplies are waning and in which large investments in pipe lines and distribution facilities have been made.

Fuel Conversion Costly

"Large investments have been made in certain plant facilities designed for utilization of natural gas in industrial processes. It has been contended that the conversion of these specially designed facilities to utilize other fuels, or the installation of new facilities using other fuels, will require large expenditures of money, time, and materials, and may cause substantial changes in the method of operation, cost of production, and end products of many industrial establishments.

"Proceedings under the Natural Gas Act have shown that it is principally in the field of direct industrial sales from interstate pipe lines that natural gas comes into direct competition with other fuels. The rates at which such sales are made are not subject to regulation under the Natural Gas Act.

"The commission fully recognizes the jurisdiction of the various state regulatory and conservation commissions regarding the production, proration, and distribution of natural gas in their respective states. It is not the commission's intention to trespass upon such authority. We seek the cooperation of the various state agencies, as well as other interested parties, so that every aspect of the public interest may be considered."

The National Conference of Petroleum Regulatory Authorities opposes the proposed investigation, declaring that regulation of production, conservation and utilization of natural gas is a state, not a federal, injunction. Several other trade associations have protested expansion of federal authority over natural-gas operations.

R. B. Harper Receives A.I.C. Honor Scroll Award

CHICAGO. — Robert B. Harper, vice president of Peoples Gas Light & Coke Co., received the Honor Scroll, awarded by the American Institute of Chemists, at a dinner in the Morrison Hotel here October 6.

Harper has been active in the chemical field of the gas industry since 1905 when he joined the Peoples Gas organization. He has been one of the outstanding leaders in the development of testing, research and manufacturing methods for the industry and has carried out research programs in gas development all over the world. He has been especially active in the American Standards Association where under his leadership 26 gas appliances have been named "American Standards." He has published a long list of contributions to the literature of gas technology, is a Fellow of the American Association for the Advancement of Science and of the American Institute of Chemists.

L. P. G. Association Urges Maximum Tank-Car Use

The Office of Defense Transportation reports a shortage of pressure cars for handling liquefied petroleum gas products, which report has prompted the Liquefied Petroleum Gas Association, Inc., to make several suggestions for attaining the utmost use of each car. These suggestions are as follows:

1. Unload tank cars immediately upon arrival, night or day.
2. Notify railroads of availability of empty car at first possible moment.
3. Follow up with railroads on their pulling the empty car from the siding so that it may start back to originating point for another load.
4. Use care in scheduling car arrivals so that there is ample storage space for unloading.
5. In cases where vapor withdrawal delays release of the car, it may be of greater value to release cars without recovering vapors in order to get the car moving again.

Low-Gravity Price Ceilings Made Specific for Stripper Operators

WASHINGTON. — Specific dollar-and-cent ceilings for the lower gravities of crude oil in Oklahoma and Kansas and of Pennsylvania Grade oil in one area of Ohio have been fixed by Office of Price Administration. Most of this oil comes from stripper pools, and the ceilings were set to facilitate operation of the stripper-well premium plan. The ceilings make possible full reimbursement by the Government of any premium payments made under this plan by first purchasers of the oil. They were made effective as of August 1 so that the prices can be applicable from the date of the inception of the subsidy plan.

At the same time, in Oklahoma and Kansas ceilings for the higher gravities of crude oil, which represent the bulk of the production, are made specific in the crude-oil regulation at the existing ceilings established through prices posted by purchasers at the wells.

In both these actions the spelled-out ceilings are at the going prices actually in effect, and no changes from prices paid will result. The specific spell-out of ceilings in the two states was approved generally by the producers and purchasers affected. The spell-out follows:

Ceilings range from $1.25 per barrel for 40° gravity and above to 83 cents for below 20° gravity. The usual 2-cent reduction is made for each degree of gravity.

There are three exceptions to this general scale. In Morel pool, Graham County, Kansas, the scale is the same from 29° to 40° and above, namely $1.03 to $1.25 per barrel, but all crude below 29° gravity has a uniform ceiling of $1.01 per barrel.

It is also provided that for the Cement pool in Caddo County, Oklahoma, and the Oklahoma City pool, the completed general spell-out for the rest of Oklahoma and Kansas applies for gravities from 20° to 40° and above, namely 85 cents to $1.25 per barrel. For each degree of gravity below 20, down to 16, ceilings are reduced 3 cents per barrel, making them 82 cents per barrel for 19-19.9° gravity; 79 cents for 18-18.9°, 76 cents for 17-17.9°, and 73 cents for 16-16.9°.

Ceilings formerly were the same for all sellers in these two states for gravities above 29°. For gravities under 29°, though the ceilings were uniform, actual prices varied.

The Zanesville area in Ohio, for which a spelled-out ceiling is provided, comprises Morgan, Muskingum and Perry counties. The ceiling is established at $2.25 per barrel for Zanesville Pennsylvania Grade crude in the three counties, and straight Pennsylvania Grade crude produced in Blue Rock Township, Muskingum County.

Regular Pennsylvania Grade crude oil produced in this area has a ceiling of $2.55 per barrel, but, because of an excessively high filtering cost, Zanesville Pennsylvania Grade and the Pensylvania Grade produced in Blue Rock Township have been sold at 30 cents off the regular price, or $2.25. Under the stripper-well premium plan, however, the ceiling in both instances would be figured at $2.55, and first purchasers paying producers the 75-cent premium for this oil would be able to obtain reimbursement of only 45 cents. The OPA ceiling will permit reimbursement of the entire 75 cents.

In another action, effective October 3, OPA clarified subsidy-plan language on direct sales.

It is expressly written out that all crude oil sold by producers must take ceilings established by the crude-oil regulation (revised maximum price regulations 436) except where the producer sells crude oil directly to a consumer for use as fuel oil or for gas-enrichment purposes. Sales under these two exceptions will have ceilings established under the fuel-oil regulation (maximum price regulation 88). It is provided, however, that where sales of crude oil are made for use as fuel oil in oil and gas-field operations the ceilings will be under revised maximum price regulation 436.

PAW Revising Figures For Military Cutbacks

WASHINGTON. — The Petroleum Administration for War is working out revisions of figures for potential military cutbacks in petroleum needs, Secretary of the Interior Harold L. Ickes told a press conference last week, but the forecast has not been completed.

DEATHS

Carl St. John Bremner, chief geologist of California-Ecuador Petroleum Co., a subsidiary of Standard Oil Co. of California, was killed in an air-line crash out of Lima, Peru, September 18. Graduated from University of California in 1921, Bremner took graduate work in geology and joined Standard of California in 1923. For the past several years he had been working in Latin America and previously had done geological work for Standard in various parts of the world.

Patrick H. O'Neil, 78, active in the oil business of California since 1912, died last week in Los Angeles. O'Neil organized Western Star Oil Co. and was its first president. He served as officer or director of Rice Ranch Oil Co., Wellington Oil Co., Petroleum Corp. of America and Santa Clara Oil Co. He also had other substantial business interests.

L. Ralph Johnson, 57, vice president of Johnson Oil Refining Co. and general manager of its plant in Cleveland, Okla., died September 25 in that city. Johnson moved to Oklahoma in 1922 after holding executive positions for oil companies in Illinois.

M. B. Shufflin, 77, independent oil operator, died September 18 in Coffeyville, Kans.

H. A. O'Neill, 72, oil operator in the Wichita Falls, Tex., area for many years, died at his home in Burkburnett, Tex., September 28.

Charles G. Black, 76, formerly vice president and a director of Standard Oil Co. (New Jersey) and from 1927 to 1933 president of its largest subsidiary, Standard Oil Co. of New Jersey, died September 28 in New York. Black had been in the service of Standard Oil 50 years when he retired in 1933, starting work as an office boy. At that time his ambition was to become a big-league baseball pitcher. Following a series of promotions he was made superintendent of the company's refinery in Parkersburg, W. Va., in 1907, later becoming superintendent of the Camden works and then general superintendent of the Bayway refinery. In 1913 he was appointed general manager at Bayway. In 1920 he was elected a director. When Standard of New Jersey was organized in 1927 he was made its president.

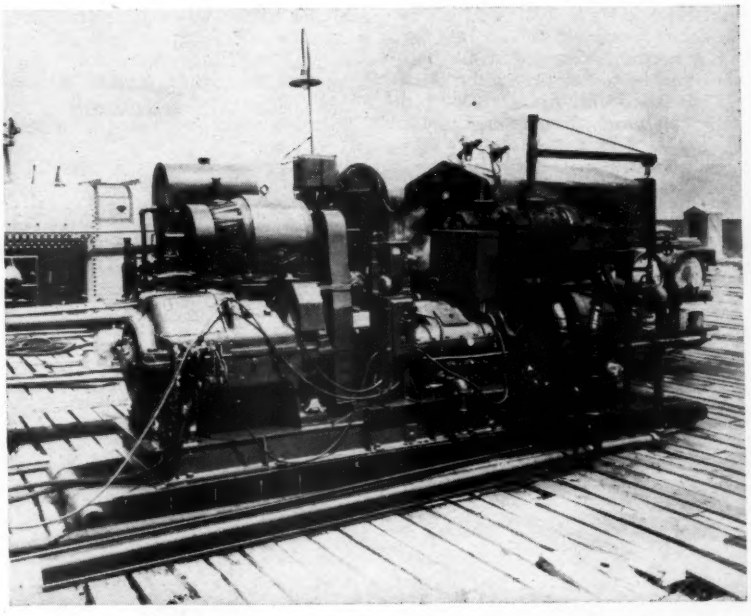
John S. Weller, 78, a director of Arkansas Fuel Oil Co. and Tropical Oil Co., and president of Elk Petroleum Corp., died September 26 in Pittsburgh. He was senior member of Weller, Wicks & Wallace, and a specialist in the laws governing oil and gas properties.

J. E. Watts, 72, independent oil operator of Gladewater, Tex., died September 28 of a heart attack at Pleasant Hill, La., where he had gone to start drilling a test in Natchitoches Parish.

Independent Electric Rotary Drive For Steam Drilling Rig

by Neil Williams

Electric power possesses certain features that are particularly applicable for operation of independent rotary drives on drilling rigs. Its utilization for this purpose in the past, however, has been confined to electric rigs. This article describes a portable generating plant, powered by a steam turbine, and an electric rotary drive installation for use on steam rigs.



Electric-power-generating unit for independent rotary drive on steam rig. Mounted on top of the main generator (left) is the small generator having separately excited field. At right is steam turbine with two turbogenerator units on top

INDEPENDENT rotary drives are being employed on an increasing number of drilling rigs, including steam, mechanical power and electric equipment. Using smaller engines or motors than those normally needed for hoisting, and conserving the duty of the hoisting prime movers and draw works drives, certain economies often can be realized in fuel consumption and by reduced maintenance. Secondarily, elimination of the drive from the draw works to the rotary table saves valuable derrick-floor space, an advantage in deep drilling when racking long strings of pipe.

Electric power generally is conceded to be especially adaptable to rotary operation. With direct-connected motors, it provides a combination of flexibility, smoothness, high torque at low speeds and convenience of operation that is very desirable. In the past, however, the use of electricity for this purpose has been confined to electric rigs. Engines employed in rotary drives on steam rigs provide a flexible and smooth power, but in the transmission of this power to the rotary through sprocket and chain drives, as in the case of horizontal reciprocating engines, much of the smoothness is lost. Vertical steam engines overcome much of the trouble but at best there is considerable vibration and bounce. On mechanical power rigs, the use of internal-combustion engines for separate rotary drives has required an additional transmission unit, which with the engine is somewhat bulky and takes up much derrick-floor space. Also, speed changes through the transmission unit to the rotary are more or less fixed and limited in number.

Inherent benefits accruing from the use of electric power for direct rotary drives have led Humble Oil & Refining Co. to experiment with the development of an electric drive suitable for operation on steam rigs. To prove the feasibility of the idea, the first drive of this type has been designed and assembled, and now is in operation on a deep drilling steam rig in the Halls Bayou field, Brazoria County, Texas Gulf Coast. Electric power in this case is supplied by a turbine-driven generator unit. In the installation it has been necessary to compete with the somewhat lower cost of the reciprocating steam-engine drive.

The principle of control used in this installation is what generally is known as Ward-Leonard; that is, the voltage of the generator is varied and the varying voltage of the generator varies the speed of the motor which is direct connected to the rotary shaft. Older methods of using a rheostatic control in series with the field of the generator required considerable conductor and relatively bulky control. The newer method is to use a small generator with a separately excited field. The

field of this generator is connected in series with a rheostat and a constant potential source. Armature leads are connected in series with the shunt field of the main generator. By varying the field on the small generator through the rheostat, which is within the driller's reach, any amount of voltage from nothing to full power on the main generator can be obtained. By this, very small conductor and control may be used.

Equipment for this first installation was salvaged both from the junk yard and obsolescent heap and put into service. The prime movers consist of a 350-hp., 3,600-r.p.m. steam turbine and a reduction gear which steps down the speed from the 3,600 r.p.m. to 900 r.p.m. To the slow-speed shaft is connected an MDP-418 150-hp., 450-r.p.m. mill-type motor, which was bought for a diesel-electric rig in 1930, and which has been converted to use as the main generator. Mounted on top this motor and belted to the motor shaft is a 30-hp., 1,750-r.p.m., 230-volt, totally enclosed, fan-cooled motor which is turned at 1,450 r.p.m. Mounted above the turbine are two turbo-generators, duplicates of a great many derrick lighting units.

The above equipment is permanently mounted on a steel skid forming an integral unit to be moved and set intact on location. It is placed convenient to the boilers to shorten steam lines. To move, it is only necessary to break the single connections to the turbines' steam inlet and discharge lines and uncouple the conductor lines to the rig.

Driving the rotary is a MDP-418, 150-hp., 230-volt mill-type motor, a duplicate of the one used in the generator unit hookup. The motor is direct-connected to the rotary shaft through a flexible coupling of a type which transmits the energy from the driver to the driven through the medium of a number of large rubber balls. This coupling affords resiliency that is highly beneficial both to the drive bushing in the rotary and the motor. Both motor and rotary are mounted on the same skid.

The motor is covered with sheet iron for protection. It receives its ventilation from a duct supplied with air by a blower driven by a 5-hp. d.c. motor set on small frame built into the engine substructure. Air inlet to the duct, which extends below the derrick floor, is from a point some distance removed from the well where fresh air is always assured. This separate ventilation is necessary for two reasons: First, to cool the motor when it is standing still with full field; and second, to render the motor gasproof. The theory of the latter is that where air is escaping, no gas can enter.

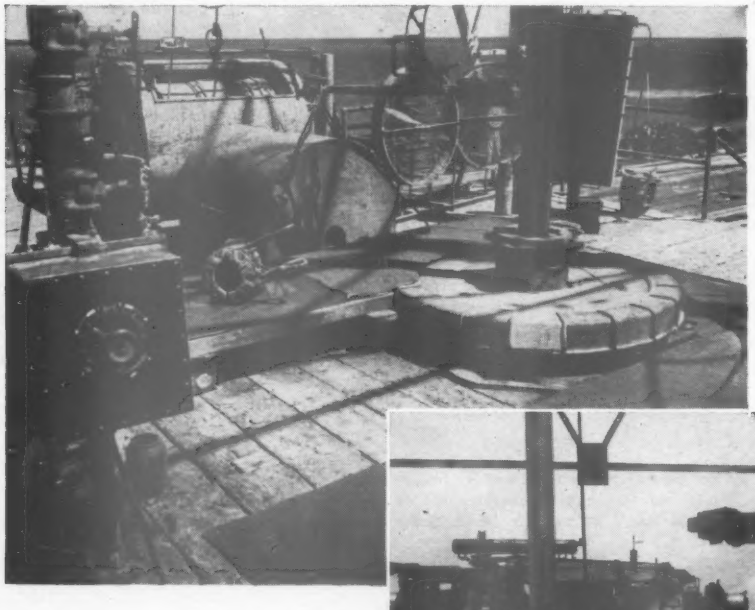
Two electrical instruments for operation of the drive are located within plain sight of the driller. One is a volt-meter calibrated in r.p.m. of the rotary. The other is an ammeter having two scales, one calibrated in amperes flowing to the rotary motor, and the other in pound-feet torque transmitted to the drill stem. On the latter, the torque scale is red lined in terms of safe torque for various depths. This is done because most drillers are not aware of the fact that at 12,000 ft. a drill stem is capable of withstanding a safe torque of only about 25 per cent as much as the same drill stem can stand at 5,000 ft. The driller's control is small and vaporproof, having a light hand dial or wheel with visual as well as touch indication of the "off" position.

Principal advantages being realized by this type of drive are:

1. The drive bushing on the rotary never bounces. This reduces wear and tear on both the bushing and the kelly substantially as compared with the bouncing usually occurring when the rotary is driven by an engine and chain.

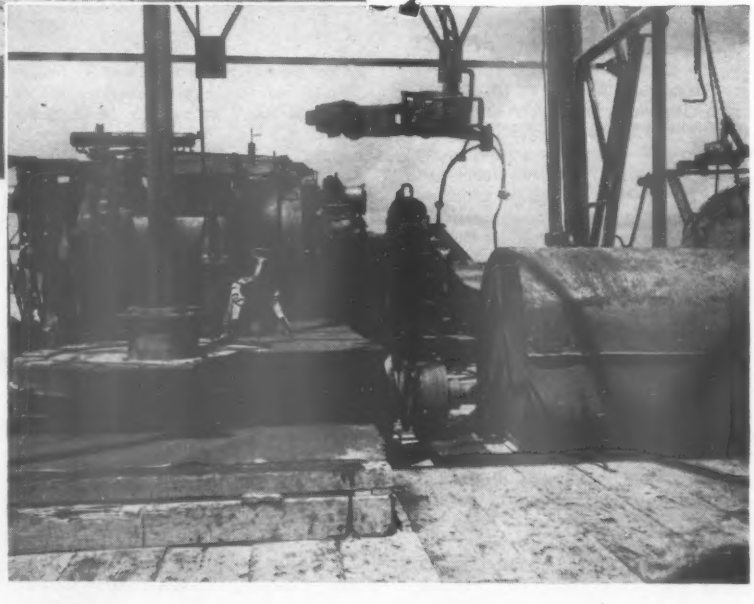
2. The pipe can be turned at any speed that the condition of the pipe and kelly will permit without the usual extreme vibration present when the rotary is driven by a reciprocating engine.

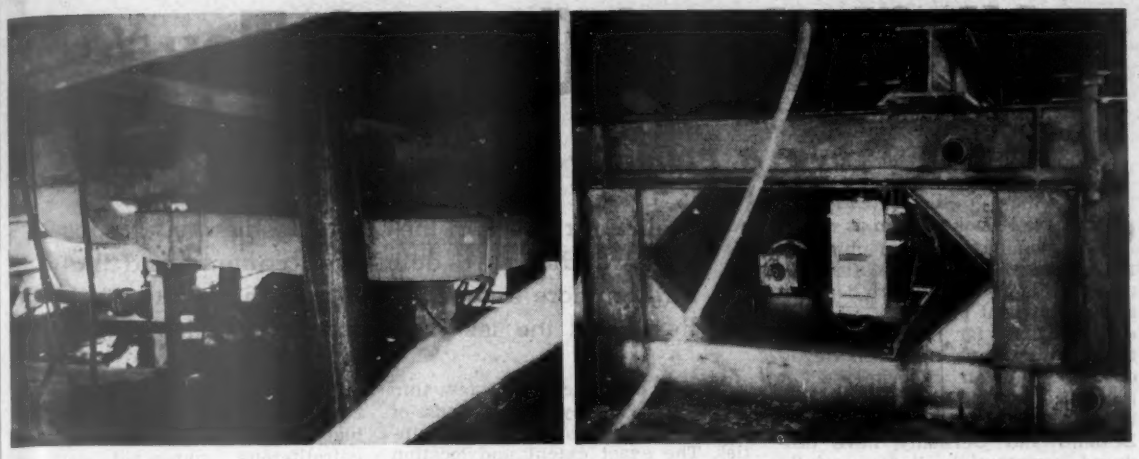
3. Where fuel is an item, considerable saving is effected by the



Left: Driller's control (left) with visual as well as touch indication of "off" position, and voltmeter and ammeter, shown with weight indicator on instrument board (right rear)

Below: Direct-connected electric rotary drive showing flexible coupling (center) and sprocket for chain drive from draw works if desired. Hood protects motor





Left: Portion of ventilating duct (under derrick floor) through which air is blown to rotary motor on floor above for cooling and prevention of gas entry. Right: Motor-driven blower (located in engine substructure) for rotary motor ventilating duct

lower water rate on the turbine as compared with that of a reciprocating engine. The turbine operates with 29-lb. steam pressure per horsepower hour, or 40 lb. per kilowatt hour.

4. Chain and sprocket wear on the draw works is saved as the drive from the draw works to the rotary is eliminated.

5. The mental hazard to the drilling crews caused by the extreme noise of chain and sprockets is removed.

Disadvantages of this type of equipment are:

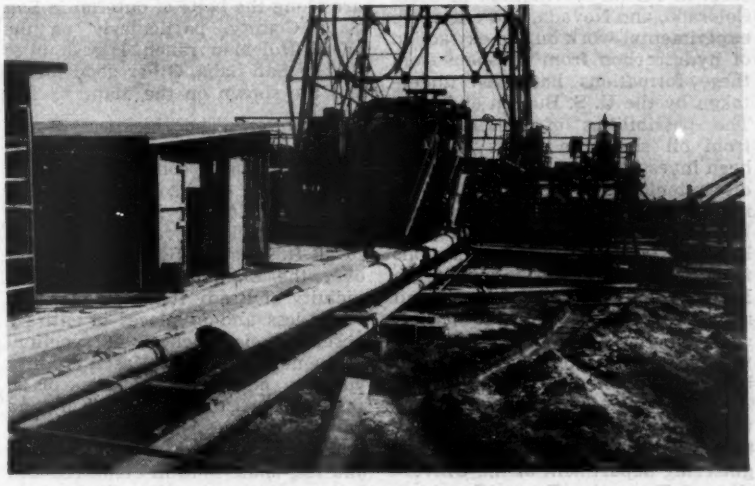
1. Initial investment is greater than with an engine or engine and chain drive.

2. Additional transportation is involved in moves due to the two units, and also to the extra auxiliary equipment, such as the ventilating ducts and conductor and wiring.

3. Slightly increased time also is required for installation.

The latter two disadvantages apply mainly to land rigs, which must be torn down and moved in sections and units to successive locations. On barge rigs, the equipment is more or less permanently installed and remains in place during moves. Also, it is hoped that when conditions of manufacture improve, totally enclosed, fan-cooled motors will be available for the rotary which will eliminate the need of ventilating ducts. This, on rigs that have to be dismantled for moves, will eliminate about 50 per cent of the trouble and expense in the installation of this equipment for the reason that the duct, which is difficult to make, mount and maintain, is one of the major items of cost.

Extra time in setting up also is occasioned by the long conductor lines which have to be laid from the generator unit to the rig, by the stringing of cables and wiring to the controls and rotary motor, and in making the various connections.



Air intake duct (open-ended pipe) for rotary motor ventilating system

Currently, services of an electrical engineer are required. However, it is proposed to install the wiring and lead lines as an integral part of the structure of the various units of the rig, and so simplify the connections that any member of the crew can make them as easily as plugging in a light socket. Also, the long conductor which is quite heavy and bulky is to be cut into short sections with suitable couplings so that it can be handled more readily.

Since the equipment for the initial installation was largely salvaged from whatever old material could be obtained it is not regarded by the company as being the best example of what could or would be done with new equipment. On the basis that 1 hp. per revolution of the rotary should be made available, it is proposed that the next assemblies, now being designed, should have a 400-hp. turbine and gear driving a 250-kw., 900-r.p.m. separately excited generator and a 15-kw., 125-volt constant-potential auxiliary generator, and a 3-kw., 125-volt exciter direct-connected to and mounted on the same base with the 15-kw. generator, both mounted on top of and belted to the 250-kw. generator. The main generator and the exciter would employ Ward-Leonard control. All this equipment should be splashproof.

It is further proposed that the rotary drive should be a rugged mill-type motor capable of 300-hp. at 900 r.p.m. The driller's control should be small and vaporproof with a light hand wheel and visual as well as touch indication of the "off" position. A blower capable of a pressure of about 5 in. of water and enough air to supply the rotary motor at full speed with an excess sufficient to cause a leakage of air through any opening in the motor or discharge duct. The blower and ducts would be eliminated, however, if a totally enclosed, fan-cooled motor were used.

Oil Shale of Central Texas

*by F. B. Plummer and Bruce Grant**

Preliminary test of the Barnett shale in Llanos region indicates a definite oil content, and that further, more detailed investigation is warranted. Results of the test are described in this article

OIL shale is looked upon as one of the possible means of obtaining motor fuel and lubricants after natural petroleum deposits are depleted and the present producing oil fields exhausted. So far the oil shales of this country have not been developed beyond an experimental or pilot-plant stage. Oil shales of Scotland and certain shales in New Zealand and Germany have produced commercial oil successfully for many years. It has long been known that rich oil-shale deposits occur in Tertiary formations of Utah, Colorado, and Nevada, and extensive experimental work on the extraction of hydrocarbon from oil shale from these formations has been undertaken by the U. S. Bureau of Mines. The possibilities of obtaining oil from oil shales in Texas has not been investigated and the extent and oil content of Texas shales is for the most part unknown. However, it has been reported in a number of publications that certain concretions from the Barnett formation of the Llano region contained free oil and many have reported that the Barnett shale in places contained so much petroliferous matter that it would burn when ignited. Accordingly, preliminary tests of the petroleum content of oil shale were carried on in the laboratories of the petroleum engineering department of the University of Texas by Bruce Grant on sets of samples of the shale collected by John Petty through a work project financed and sponsored by the Works Progress Administration of the federal Government. The results of these tests are given in accompanying tables and indicate that the Barnett shale has a definite oil content and should, therefore, be considered as a possible source of oil worthy of further and more detailed investigation.

Occurrence and extent.—The oil shales of the Llano region are confined to the Barnett formation of upper Mississippian age. This formation extends, with the exception of certain interruptions due to displacement by faults, erosion on crests of structural ridges, and burial beneath Cretaceous and Recent deposits, in a narrow belt only 100 to 400 ft. wide from a point about 3 miles southwest of Lampasas County to the San Saba-McCulloch County line 1 mile west of Richland Springs Cavern. There are also a few thin and comparatively short bands of shale in McCulloch and Mason counties. The exact extent and location of the outcrop of this interesting formation is shown on Fig. 2. The best exposures and the thickest outcrops are along the belts of outcrop in San Saba County, particularly on the Ward Holeman ranch 4 to 8 miles east of San Saba. Other good localities are shown on the map.

Thickness.—The thickness of the formation ranges from 1 to 96 ft. as shown in the accompanying table. Along most of its outcrop across San Saba County, it has a rather uniform thickness ranging from 30 to 40 ft. West of San Saba County over the Ellenburger ridge in the vicinity of Brady it thins down to 1 ft. or less and in places is entirely absent. It is thickest in synclinal areas near faults in Mason County where a maximum thickness of 96 ft. was measured. In Mason and Kimble counties, however, the section contains much more limestone and less shale than in San Saba and Lampasas counties. Very little shale occurs on the southeast side of the region in Burnet and Blanco counties.

Description. — The Barnett shale consists of a black and brownish-black, extremely thin-bedded, soft, petroliferous, somewhat carbonaceous shale which weathers to a yellowish brown or yellowish gray color. The most characteristic features of the shale are large, flattened, spherical, calcareous concretions which, when broken give a strong odor of petroleum and contain cavities which in some instances are filled with a light crude oil. The concretions are 6 to 20 in. in diameter and 4 to 12 in. thick. The shale also contains a few thin layers of limestone or calcareous siltstone. In most places across San Saba County, there is a single layer of black, highly fossiliferous, petroliferous, oolitic limestone about 10 in. thick at the top and two or three thin fossiliferous, oolitic, impure limestones 1 to 3 in. thick in the lower portion of the section. No sandstone is present. Rarely, molds of large nautiloids 4 to 6 in. in diameter and 6 to 12 in. long occur. These in some places are completely silicified.

A typical section described from one of the test pits dug through the shale on the Ward Holeman ranch is given below. A more detailed de-

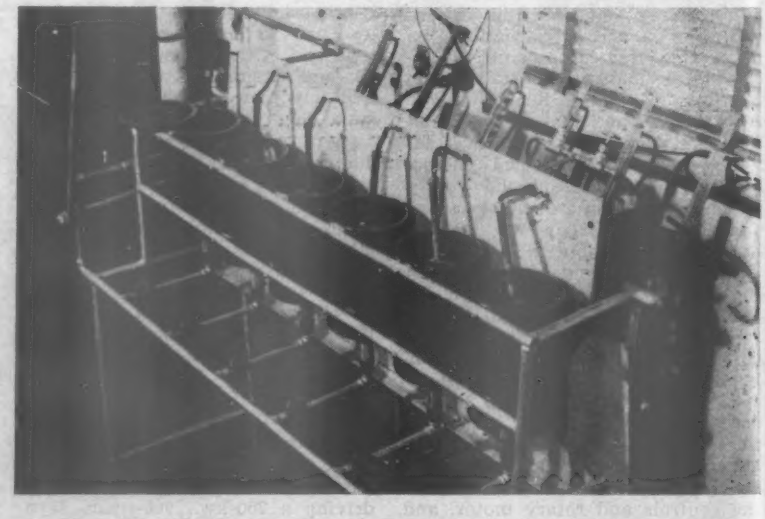


Fig. 1: Assembly of retorts and condensers used in testing oil shales in region

*Petroleum Engineering Department, University of Texas.

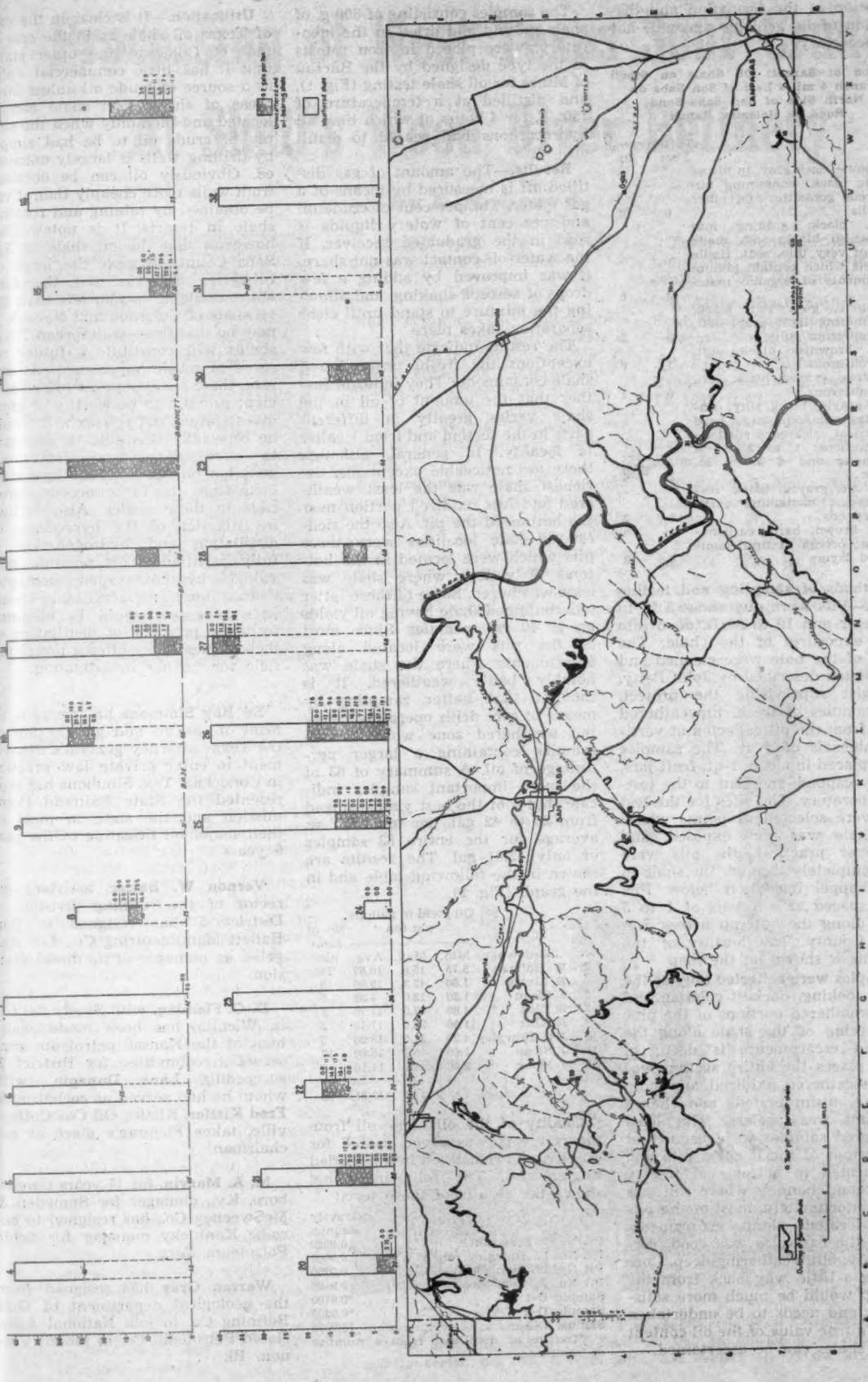


Fig. 2: Oil-shale outcrop in San Saba County, showing location of test pits and sections of the shale in the pits showing concentration of oil in the shale. Note that oil is found only in unweathered portions of shale section

scription of the formation and discussion of its geologic age will not be necessary.

Section of Barnett Oil Shale on Small Branch 4 miles East of San Saba on North Side of San Saba-Bend Road on Holeman Ranch

	Thickness Feet	Thickness In.
Limestone, dark gray, in places quite black; containing numerous goniatites and other fossils	0	10
Shale, black, grading into brownish black; soft, made up of very thin, soft, fissile sheets which contain minute fragments of organic material	14	0
Limestone, grayish black, weathering light gray, soft, petroliferous, silty	0	2
Shale, brownish black, soft, petroliferous	1	8
Limestone, grayish black, soft, petroliferous	0	1
Shale, grayish black, silty, containing numerous large, hard spherical calcareous siltstone concretions; 1 to 2 ft. in diameter and 6 to 10 in. thick	1	4
Limestone, grayish black, fossiliferous; containing small pelecypods	0	2
Shale, brown, hard, carbonaceous; occurs in thin, laminated layers	6	8

Methods of sampling and testing shale.—Pits were dug about 3 ft. in diameter and 10 to 20 ft. deep into good exposures of the shale. The walls of the hole were cleaned and the section described by John Petty, geologist supervising the project, and samples of fresh, unweathered shale from the pit collected at vertical intervals of 1 ft. The samples were placed in clean, 1-qt. fruit jars, tightly capped, and sent to the testing laboratory. The sites for the test pits were selected at points where the shale was well exposed, and wherever practical, the pits were dug completely through the shale to the Chappel formation below. Pits were spaced at intervals of 1 to 5 miles along the outcrop across San Saba County. The locality of the test pits is shown on the map.

Samples were collected only of the better looking, darkest colored, and least weathered portions of the pits. Weathering of the shale along the exposed escarpments is deep; in many places the entire section was badly weathered, oxidized, and more or less disintegrated and hence sampling was useless. The least weathered samples were usually at the bottom of the deepest pits and pits located in bottoms of freshly cut stream channels where soil was thin. Unfortunately, most of the pits were located along escarpments where the exposure was good, digging easy, but weathering deep. Core drilling a little way back from the outcrop would be much more satisfactory and needs to be undertaken before a true value of the oil content of the shales can be ascertained.

The samples consisting of 300 g. of shale ground and dried in the laboratory, were placed in iron retorts of the type designed by the Bureau of Mines for oil shale testing (Fig. 1), and distilled at a temperature of 750° F. for 4 hours at which time all hydrocarbons had ceased to distill off.

Results.—The amount of gas distilled off is measured by means of a gas meter. The per cent of crude oil and per cent of watery liquids is read in the graduated receiver. If the water-oil contact was not sharp, it was improved by adding a few drops of aerosol, shaking, and allowing the mixture to stand until clear separation takes place.

The results indicate that with few exceptions the fresh, unweathered shale contains oil. They indicate further that the amount of oil in the shale varies greatly in different parts in the section and from locality to locality. In general, although there are noticeable exceptions, the richest shale was the least weathered and less oxidized portion near the bottom of the pit. Also the richest oil-shale localities were those pits which were located in the bottoms of valleys where shale was least weathered. Some of these latter pits contained shale having oil yields up to 40 gal. per ton. Since most of the pits were located along escarpments where the shale was notably badly weathered, it is thought that better sampling by means of core drills operating below the weathered zone would obtain samples containing a larger percentage of oil. A summary of 63 of the more important samples indicate that 5 of the best yields ranged from 20 to 42 gal. per ton with an average for the entire 63 samples of only 13.61 gal. The results are shown in the following table and in the graph (Fig. 2).

Location No.	Landowner	Oil yield in gallons per ton Min.	Max.	Avg.	No. of samples
3.	W. Holman	5.75	15.6	10.67	11
5.	B. Lively	1.60	42.2	19.00	9
7.	J. Sloan	1.20	12.0	7.30	7
8.	R. Ellis	4.80	17.5	11.70	5
9.	R. Ellis	11.50	25.5	17.10	3
12.	J. C. Howgley	4.20	21.5	13.20	5
16.	J. Sloan	1.60	40.0	15.80	17
18.	J. Sloan	2.40	20.1	14.10	6
	Total average	4.13	24.3	13.61	63

Quality of the oil.—The oil from the receivers was saved, tested for gravity, and redistilled in a modified Engler still. The following table shows the results of these tests:

	Gravity Baume
Pit No. 9, Ellis ranch	0.9520
Pit No. 12, Howgley ranch	0.9080
Pit No. 16, Jym Sloan	0.9250
Pit No. 18, Jym Sloan	0.9460
Sample D-1	*0.9100
Sample D-2	*0.9205
Sample D-3	*0.9098

*Mixture of distillates from a number of samples.

Utilization.—It is clear in the case of Texas oil shale as in the case of that of Colorado and other states that it has little commercial value as a source of crude oil unless large areas of the richest shale can be located and then only when the supply of crude oil to be had simply by drilling wells is largely exhausted. Obviously oil can be obtained from wells more cheaply than it can be obtained by mining and roasting shale in retorts. It is noteworthy, however, that the oil shale in San Saba County is near the large oil refineries of Texas, and, therefore, more available to markets than the oil shale of Colorado and Nevada. It may be that these widespread Texas shales will constitute a future reserve of much importance. At any rate, these shale deposits offer sufficient promise to be worthy of more investigation and research. It would be especially desirable to ascertain the effect of the process of hydrogenation on the yield of hydrocarbons from the carbonaceous materials in these shales. Also further investigation of the byproducts of distillation and hydrogenation is fully justified. It is possible that valuable byproducts such as ichthyol, ammonium, nitrate, and other chemicals and dyes could be obtained from the products of distillation of these shales. They offer a promising field for further investigation.

Ed Roy Simmons has resigned as head of the oil and gas section of the Texas attorney general's department to enter private law practice in Corsicana, Tex. Simmons has represented the State Railroad Commission and the state in most of their major oil litigation of the past 6 years.

Vernon W. Balzer, assistant director of the refining division of District 5, has resigned to join Hallett Manufacturing Co., Los Angeles, as manager of its diesel division.

D. C. Fleming, with Skelly Oil Co. in Wichita, has been made chairman of the Kansas petroleum conservation committee for District 2, succeeding **Lane Dunagin,** with whom he had served as cochairman. **Fred Kistler,** Kistler Oil Co., Coffeyville, takes Fleming's place as cochairman.

M. A. Marvin, for 17 years Owensboro, Ky., manager for Snowden & McSweeney Co., has resigned to become Kentucky manager for Sohio Petroleum Corp.

Warren Gray has resigned from the geological department of Gulf Refining Co. to join National Associated Petroleum Co. in Mount Vernon, Ill.

Processing of West Texas Sour Crudes At Shell's Wood River Refinery

*by L. R. Gray**

This article, the first of two installments, gives the corrosion rates when processing sour crudes, along with materials and methods employed to combat this corrosion. Procedures and results for both topping and cracking operations are presented in detail. The second installment, which will follow in an early issue, will discuss how washing and hot settling removes about 85 per cent of contained salts. It will also describe a special maintenance and safety methods required for plants operating on sour crudes.

THE data included here have been obtained from the operation of a 35,000-bbl. per day topping unit, processing 100 per cent West Texas crude of about 1.5 per cent sulfur content and a salt content after desalting of 11 lb. per 1,000 bbl. The unit is comprised of three columns which successively take overhead hexanes and lighter, light SR† gasoline, and SR naphtha. The on-stream time averages 94.5 per cent. The operating cycle is 6 months per run, with approximately 1 week downtime for maintenance and inspection between runs. The unit is equipped with seven direct-fired heaters, which are so manifolded that they can be shut down for maintenance and inspection as required without interrupting operation. Heater-tube inspection periods vary from 100 to 180 days.

The light SR gasoline and SR naphtha are scrubbed with caustic soda at the unit to remove H_2S, while NH_3 is injected into the vapor lines from the three fractionating columns (in sufficient quantity to maintain the pH of the accumulator water at 8.4) to reduce corrosion to the condenser shells and tubes. Chemical consumption is as follows: Caustic soda, 0.2 lb. per bbl.; ammonia, 0.04 lb. per bbl.

*Chief technologist, Wood River, Ill., refinery, Shell Oil Co., Inc.

†SR = steam refined.

Corrosion rates for individual equipment items are as follows:

Columns

No. 1 column.—The column operates at a top temperature of 200° F. and a bottom temperature of 450° F., taking hexanes and lighter overhead. The vessel is all steel with steel trays and cast-iron caps. Corrosion allowance is $\frac{1}{4}$ in. No significant corrosion has been observed in over 2 years of operation.

No. 2 column.—Operating temperatures are 320° F. top and 550° F. bottom, taking light SR gasoline (180°-290° F.) overhead. The column is steel (¼-in. corrosion allowance) with steel trays and cast-iron caps. No significant corrosion has been observed in 4 years' operation.

No. 3 column.—Operating temper-

These additional articles on refining of sour crude have appeared recently in The Oil and Gas Journal:

1. Alloys Best Suited to Resist Sour Crude Corrosion at High Temperature; Sept. 30, 1943, p. 33.

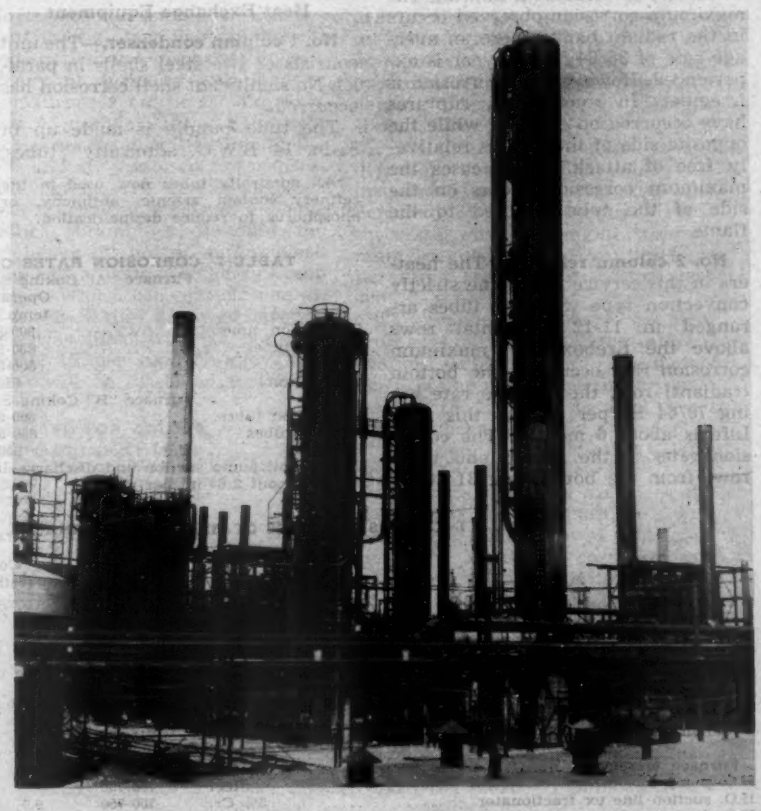
2. Effect of Sulfur in West Texas Crude on Refinery Operations, Oct. 21, 1943, p. 61.

3. Sulfur Removal From Sour Crudes Reduces Corrosion, etc., June 24, 1943, p. 111.

4. Neutralization, Alloy Steels Used in Handling Sour Crudes; June 3, 1943, p. 27.

5. Refining of West Texas Crude; Oct. 14, 1943, p. 43.

6. Problems Involved in Conventional Refining of Sour Crudes; Aug. 5, 1943, p. 27.



General view of topping unit No. 4 which processes West Texas crudes at the Wood River, Ill., refinery of Shell Oil Co., Inc. No. 1 is at right, No. 2 is in center, and No. 3 is at left. Salt settlers are to the extreme left

atures are 345° F. top and 650° F. bottom, producing 440 end point SR naphtha overhead and a 680 end point gas-oil sidecut. Originally, this column was steel (¼-in. corrosion allowance) with stainless type 405 alloy trays and caps below the feed tray, and steel trays with pressed-steel caps above the feed tray. Corrosion was encountered below the feed tray. The maximum corrosion rate, observed near the reboiler return, was 6/64 in. per year. A 5/64-in. liner of 12 per cent chrome steel was installed which covers the bottom head and shell up to the bottom of the tray above the feed tray.

A similar topping unit operating alternately on sour and sweet crude experienced similar corrosion in the No. 3 column, and a brick lining was installed, which has been in service 5 years with satisfactory results.

Some localized corrosion, observed on the top tray adjacent to the reflux return sump, has been eliminated by installing a monel liner over the area attacked.

Heater Tubes

No. 1 column reboiler.—This heater is a standard Foster Wheeler heater, end fired, with radiant tubes on both side walls. The coil outlet temperature is 500° F. The tubes are steel, 5-in. I.P.S., with 0.375-in. wall and 6-in. with 0.432-in. wall. The maximum corrosion observed occurs in the radiant bank where an average rate of 36/64 in. per year is experienced. However, the corrosion is irregular. In some cases, ruptures have occurred on one side while the opposite side of the tube is relatively free of attack. In all cases the maximum corrosion occurs on the side of the tube exposed to the flame.

No. 2 column reboiler.—The heaters in this service are of the strictly convection type with the tubes arranged in 11-12 horizontal rows above the firebox. The maximum corrosion rate occurs in the bottom (radiant) row, the average rate being 70/64 in. per year in this row. Life is about 6 months. The corrosion rates in the second and third rows from the bottom are 31/64 in. and 19/64 in. per year, respectively. Life of the second row is about 1 year. Above this row tube life exceeds 2 years. All tubes are standard 900-lb. steel pipe.

No. 3 column feed plate reboiler.—The heaters in this service are similar to No. 2 column reboiler. Corrosion is maximum in the bottom (radiant) row, the average rate in this row being 48/64 in. per year. The corrosion rates in the second and third rows are 33/64 in. and 28/64 in. per year, respectively. All tubes are 900-lb. steel pipe.

No. 3 column bottom reboiler.—The heaters in this service are similar to the No. 2 column reboiler furnaces. Corrosion is highest in the bottom (radiant) row. The rate varies widely from 6/64 in. to 36/64 in. per year, but the reason is unknown. In the second and third rows corrosion rates vary similarly, ranging from 9/64 in. to 36/64 in. in the second row, and 6/64 in. to 24/64 in. in the third row.

Three 7 per cent chrome tubes installed in the bottom row of this heater have been in service for 3 years, and no appreciable corrosion has occurred. The remaining tubes in the bottom row of this furnace are standard 900-lb. steel pipe and have been replaced five times during the 3-year period.

Heat Exchange Equipment

No. 1 column condenser.—The unit consists of two steel shells in parallel. No significant shell corrosion has occurred.

The tube bundle is made up of ¾-in. 14 B.W.G. admiralty* tubes, and an average life of 1 to 1½ years is experienced. There is some indication of poor vapor distribution due to the deposition of salts, and provisions are being made to wash the shell side with water. These units have been in service only 2 years, and the data available should not be considered final.

*All admiralty tubes now used in the refinery contain arsenic, antimony, or phosphorus to reduce dezincification.

No. 2 column condenser.—This unit consists of three shells in series. The top (hot) shell was lined with monel initially, but the center and bottom shells are steel. The corrosion rate is 4/64 in. and 1/64 in. per year, respectively, in center and bottom shells. The monel-lined shell shows no sign of corrosive attack.

The tube bundles are constructed of ¾-in. 14 B.W.G. admiralty tubes, with a minimum life of 18 months, and an average life of over 2 years.

No. 3 column vapor-to-crude exchanger.—This exchanger is made up of four shells connected in two banks of two in series. The corrosion rate in the bottom shells varies from 1/64 in. to 6/64 in. per year, while the rate in the upper shells is somewhat less.

The life of ¾-in., 14 B.W.G. admiralty bundles varies from 5 to 23 months, averaging about 11 months. It is estimated that steel bundles would last 3 months in this service.

No. 3 tops coolers.—The shells are steel, and no appreciable corrosion has been encountered. Bundles made up of ¾-in., 14 B.W.G. steel tubes have an average life of 25 months. Recently the bundles have been retubed with admiralty.

Residue-to-crude exchanger.—The exchanger is composed of four units, connected in series, with steel shells, and tube bundles of ¾-in., 14 B.W.G.

TABLE 2—CORROSION RATES OF COKING FURNACES AND LINES

	Operating temp., °F.	Material	Corrosion rate (in. per year)
Furnace "A" Coking Section (Equiflux Type A)			
Convection tubes	800-850	5% chrome	2.2/64
Radiant tubes	850-950	Calorized 1¼% Cr.	1/64
Fittings	800-950	5% chrome	1/64
Crossovers	850	5% chrome	....
Furnace "B" Coking Section (Equiflux Type B)			
Convection tubes	800-850	5% chrome	3.4/64
Radiant tubes	850-950	Calorized 1¼% Cr.	3.0/64
Fittings	850	9% chrome	....

The hot-oil pump suction and discharge lines are 5% chrome steel and corroded at a rate of about 2/64 in. per year.

TABLE 1—CORROSION RATES OF HEAVY-OIL FURNACES, PUMP AND LINES

	Material	Oper. temp.	Corrosion rate (64th inches/year)			Ratio— (corr. without lime) (corr. with lime)		
Dubbs No. 17—			Prior 1939	1940-1941	1942-1943	Prior 1939	1940-1941	1942-1943
H.O. furnace			8.4	9.1	12.0	2.5	3.9	3.7
Convection tubes 1-12	5% Cr.)		...	...	6.0	...	...	3.7
	7% Cr.)	735-815	15.6	...	15.0	2.5	...	4.6
13-24	5% Cr.)		None in service					
	7% Cr.)		9.5	...	16.0	2.7	...	6.4
Radiant tubes 25-40	5% Cr.)	815-895	...	...	8.0	...	...	6.4
	7% Cr.)		3.9	...	4.0	...	...	...
Furnace crossovers	7% Cr.)					2.5	3.1	
H.O. pump blocks	Steel	700-750	...	24.5	32.0	...	...	...
H.O. suction line ex fractionator	5% Cr.	700-750	9.9	5.4	...	3.9	...	...
H.O. discharge line to furnace	5% Cr.	700-750	9.9	...	...	3.9	...	...
Vapor line to fractionator	5% Cr.	800-815	(Same as H.O. furn. conv. tubes)					
Quench suction ex fractionator	Steel	650-680	...	11.9	24.0	...	...	...

steel tubes. Corrosion to the shells is slight. The hottest bundle (where residue is 650° F.) has a life of about 12 to 13 months. The other three bundles have been in service 4 years. "Croloy 7" tubes were installed in one bundle (the second exchanger in series, counting from the hot end) and have been in service 13 months. Recent inspections indicate they are still in good condition.

Process piping. — All process piping is steel. The maximum corrosion rate encountered in any of these lines is 12/64 in. per year.

The data included in this section have been obtained from the operation of a 15,000-bbl. per day two-coil selective cracking and continuous residuum coking unit. The unit, which consists of two parallel cracking sections and a two-furnace coking section, operates on a blend of reduced crudes of about 20° to 22° A.P.I. gravity, containing 30 to 50 per cent of West Texas stocks. The operating cycle is 60 to 70 days with about 3 to 5 days' downtime for inspection and maintenance between runs. On-stream time averages about 91 per cent.

Lime is injected into the unit to reduce corrosion, the amount used being 0.4 to 0.5 lb. per barrel of topped crude charged. (It should be noted in this connection that lime has little effect where it does not actually contact with the metal.) The method of injection is as follows: Hydrated lime is mixed with topped crude in two 2,400-gal. tanks, agitated by a propeller mixer located in the bottom of the tanks, to form a slurry containing 0.5 lb. lime per gallon of oil. The slurry is injected into the topped-crude stream on the downstream side of the centrifugal unit charge pump. Steel reciprocating pumps and displacement meters are used for handling and measuring the slurry.

Temperature has been found to exert an appreciable influence on the rate of corrosion. In the range of 700° to 800° F. corrosion is particularly severe, with the maximum rate occurring at about 750° F. Above and below this range, the attack decreases in severity.

Corrosion data are summarized below for the various items of equipment. All corrosion rates, unless otherwise noted, apply to operation when using lime. No ammonia is used on this cracking unit.

Light-oil furnaces and lines.—The furnaces are of Alcorn design, with radiant heating and soaking sections, and a central downflow convection section. During initial operation, severe corrosion was experienced in the steel convection tubes of this furnace, which charges a 660-end-point gas oil. Corrosion rates were 20/64 in. per year in the top (outlet) tubes and 11/64 in. per year in the bottom (inlet) tubes. Oil temperatures in the convection section are 600° F. inlet and 800° F. outlet. The steel tubes were replaced with 5 per cent chrome, 0.5 per cent moly. alloy, which has been very satisfactory; metal loss is only 1/64 in. per year.

The tubes in the radiant sections of the furnace are 5 per cent chrome, 0.5 moly. (original equipment) and corrosion has been very low (less than 1/64 in. per year in the roof-soaking section, which operates in the temperature range 900° to 935° F.).

No serious corrosion has been observed in the steel light-oil hot-oil pump suction and discharge lines.

Heavy-oil furnaces and lines.—These furnaces are of the Equiflux "Type A" design. Tube and line corrosion is severe in this section of the plant, and alloy is used to a considerable extent. The actual corrosion rates experienced are listed in Table 1. Since obtaining these data, the steel heavy oil hot oil pump block on the east cracking section has been replaced with 5 per cent chrome alloy block while the west section block was lined with 25 per cent chrome, 12 per cent Ni-alloy. The pumps will be discussed further in a separate section on pump construction.

Coking furnace and lines.—Corrosion rates on this equipment are relatively mild, as indicated in Table 1. In general, tube replacements in these furnaces are necessitated by swells, cracks and external oxidation rather than by corrosion.

Vessels. — The cracking-section main fractionators are steel and high corrosion rates were experienced during the initial period of operation as follows:

Location—	Approx. temp., °F.	Rate in. per yr.
At bottom baffle	735	21/64
Tray 5 (L.O. drawoff)	600	5/16
Tray 11	500	0.7/64

A ganister liner was installed but proved unsatisfactory. Subsequently the ganister was replaced with a 12 per cent chrome liner (Type 410) which extends upward to the bottom of the eleventh tray (trays are numbered from bottom up).

The light-oil accumulators which operate at about 600° F. were originally steel. Corrosion was encountered at a rate of 4/64 to 6/64 in. per year, the maximum rate being observed in the center of the vessel. A brick liner was installed, but this proved unsatisfactory and was replaced with a Type 410 liner.

The flash chambers on the cracking section are steel, originally metallized with 0.015-0.02 in. of aluminum. The metallized coating was unsatisfactory and a 12 per cent chrome liner (Type 410) was installed. The corrosion rate prior to the installation of the liner is not definitely known for the liner was installed as soon as corrosion was detected. This was required, since the vessel was operating at its maximum pressure rating. Operating temperatures are 840° F. bottom and 800° F. top.

The reaction chambers are steel with a metallized aluminum internal coating (0.015-0.020 in.). The metallized coating failed early in the operation of the unit but the steel vessel has not been seriously corroded in 8 years' operation. Operating temperature is 890°-900° F.

The coke chambers are steel and were originally metallized with aluminum, which proved unsatisfactory. The maximum corrosion rate experienced was 12/64 in. per year at the top of the chambers, which

TABLE 3—RELATIVE CORROSION RATE FOR ALLOYS

Material—	Relative corrosion rate— Shell data	Natl. tube data	Relative cost*
Low carbon steel	1.00	1.00	1.00
5% chrome, 0.5% moly.	0.38	0.28	3.30
7% chrome, 0.5% moly.	0.17	0.23	3.70
9% chrome, 1.5% moly.	0.11	0.19	....
8% chrome, 1% moly.	....	....	4.35
18% chrome, 8% Ni-Ti.	....	....	14.49

* Based on data in National Tube Co. Bulletin No. 26 (Revised 1942).

TABLE 4

Pump service—	Reduced crude charge	Cracker H.P. quench	Cracker L.P. quench	Coker charge	Gasoline reflux
Temperature, °F.	300	650	560	790	120
Case	Cast steel	11.5%-13% chrome	Cast steel	11.5%-13% chrome	Cast steel
Case wear ring	Nickel cast iron	11.5%-13% chrome	11.5%-13% chrome	11.5%-13% chrome	Nickel cast iron
Impeller	Nickel cast iron	11.5%-13% chrome	11.5%-13% chrome	11.5%-13% chrome	Nickel cast iron
Impeller wear rings	11.5%-13% chrome	11.5%-13% chrome	11.5%-13% chrome Stellited	11.5%-13% chrome Stellited	Case hardened steel
Shaft	SAE 3440 H.T. steel	11.5%-13% chrome	11.5%-13% chrome	11.5%-13% chrome	SAE 2330 H.T. steel
Shaft sleeves	11.5%-13% chrome 350 Brinell	11.5%-13% chrome	11.5%-13% chrome Stellited	11.5%-13% chrome Stellited	11.5%-13% chrome

then he thought to himself

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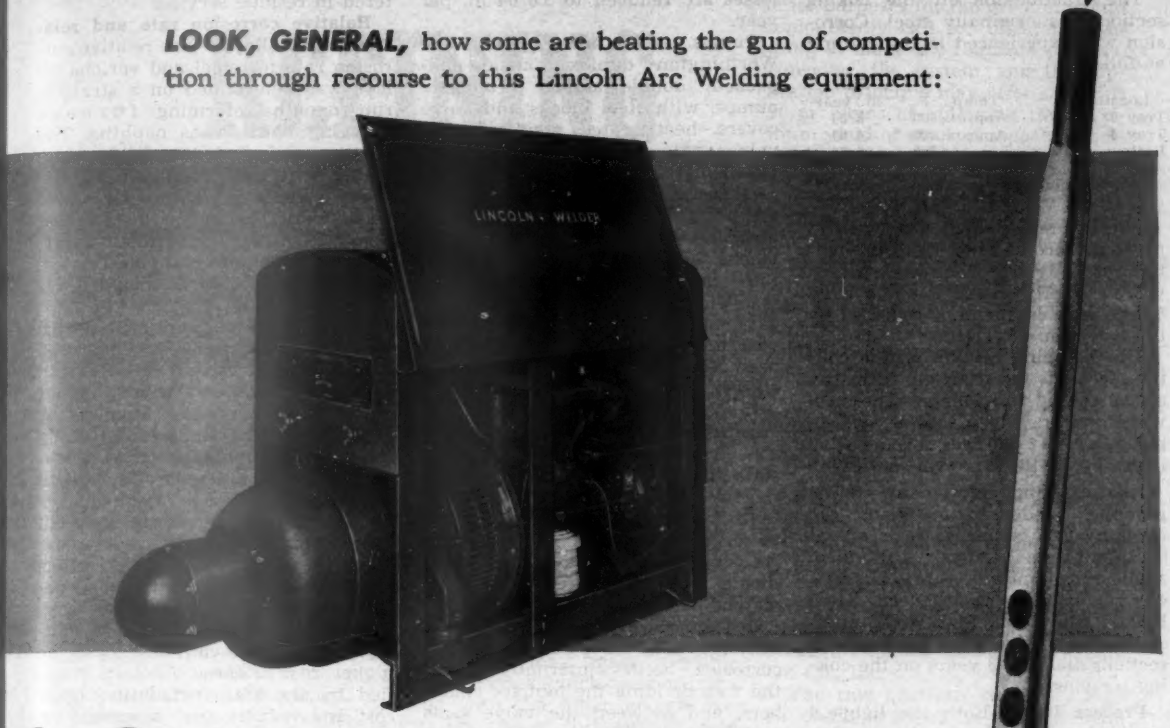

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operate at 850°-860° F. The vessels are now lined with 12 per cent (Type 405) alloy.

The fractionator on the coking section was originally steel. Corrosion was experienced in the column as follows:

Location*—	Temp., °F.	Rate, in./year
Tray 9	Approx. 500	2/64
Tray 3	Approx. 600	4/64
Bottom	800	6/64

*Trays numbered from bottom up.

The column is now lined with 12 per cent chrome alloy from the bottom to Tray 11. The liner, which was originally installed up to Tray 3, has been extended as required by the corrosion experience.

The stripping column on the coking section is fed from the fifth tray of the coking fractionator. The steel vessel corroded at a rate of 5/64 in. per year. A 12 per cent chrome alloy liner (Type 410) is now in service.

Heat-exchange equipment. — The gasoline condenser on both the cracking and coking sections are of shell-and-tube design, with steel shells and admiralty tubes. No serious corrosion is experienced. Tube bundle life (1-in., 12 B.W.G. tubes) averages 3 to 4 years on the cracking sections and 2 to 3 years on the coking sections.

Process lines.—Both the light-oil and heavy-oil transfer lines were originally 5 per cent chrome, 0.5 per cent moly. piping. Corrosion is low—less than 1/64 in. per year. Operating temperatures are 980° F. and 900° F. respectively.

Metal loss in the drawoff line from the reaction chamber to flash chamber is high. Where steel pipe is used, rates as high as 11/64 in. per year are experienced. There are indications that this may be due as much to erosion as to corrosion. Some 5 per cent and 7 per cent chrome piping has been used with little advantage being noted over the use of steel. The temperature is about 875° F.

The residue drawoff line from the flash chamber was originally steel, and corrosion rates as high as 18/64 in. per year were experienced. Most of the steel pipe has been replaced with 5 per cent chrome alloy.

No corrosion difficulties have been encountered with the steel coking-furnace transfer lines which operate at about 930° F. Rates are about 2/64 in. per year maximum, the average being about 1/64 in.

Corrosion to the vapor line from the coke chambers to the fractionator (temperature 850° F.) is severe, metal loss averaging 12/64 in. per year (maximum 18/64 in.) with steel piping. Five per cent chrome alloy is now used, and the corrosion rate is about 2.5/64 in. per year.

Steel tar-oil lines from the bottom of the coking fractionator (temperature 800° F.) corrode at a rate of about 12/64 in. per year. Five per cent chrome alloy is now used and losses are reduced to 3.6/64 in. per year.

Pumps. — All hot-oil pumps are Worthington duplex, outside-end-packed, double-acting plunger pumps, with steel blocks and valve covers, heat-treated stainless steel valves, valve seats and springs, and steel plungers with Janney alloy-steel jackets. Corrosion to the light-oil pump blocks has been light; however, the heavy-oil and coker blocks are severely attacked, the rates being about 24/64 and 32/64 in. per year, respectively. Recent data indicate rates of 60/64 in. per year in the latter. The increase has been attributed to the elimination of lime injection.

In order to reduce the corrosion experienced in the heavy-oil blocks, a 5 per cent chrome block was installed on the east section, while the west section block was lined with 25-12 per cent Ni-steel by depositing weld metal in the block. As yet, no data are available to indicate how successful this lining method has been.

Inspection of pump blocks is a difficult task, since the maximum corrosion occurs internally across the web dividing the plunger chambers, and between the valve seats and plunger chamber, where the steel is subject to corrosion on both sides. Special calipers have been designed to inspect these regions. Failure at any of these points is not a safety hazard, of course, but does render the pump inoperative due to internal bypassing of the liquid.

Plunger liners are now made at the refinery machine shop, by shrinking 14-16 per cent chrome sleeves (heat treated to 450-500 Brinell) on the plungers. The original steel valve covers have been provided with a 12 per cent chrome alloy (Type 410) tapered sleeve cover.

Two Worthington 6-in. by 12-in. duplex piston pumps in quench-oil service (operating temperature 700° F.) were originally equipped with steel liquid ends. Corrosion was severe (5/64-12/64 in. per year), and the blacks have been replaced with 5 per cent chrome alloy.

The hot-residue pumps charging the coking section are steel reciprocating pumps. Cracked gasoline reflux pumps are centrifugal with cast semisteel case and impeller.

Storage tanks.—Corrosion to storage tanks occurs primarily in two locations; the roof and the tank bottom and lower ring. Actual corrosion rates are available only for storage tanks handling West Texas reduced crude and cracked residue. Rates in both these services are 2/64 in. to 3/64 in. per year for roof places and about 1/64 in per year for side plates. Experience indicates that crude-tank corrosion rates are not much greater than those encountered in residue service.

Relative corrosion rate and relative cost of alloys.—The relative corrosion rate for steel and various alloys was determined on a straight-run naphtha-reforming furnace charging West Texas naphtha. The results are included in Table 3, together with data published by National Tube Co. These data have been found to apply to cracking processes in general without excessive error. The approximate relative cost of the alloys is included for comparison.

In general, 5 per cent chrome, 0.5 per cent moly. steel is being used for furnace tubes and lines, except in a few locations where higher chrome contents are economical. Furnace return bends are usually installed with higher chromium content than the tubes, i.e., 7 per cent return bends with 5 per cent tubes, 9 per cent return bends with 7 per cent tubes. This has been done to avoid frequent replacement of return bends since two tubes must be destroyed to replace a bend.

Liners now in service are exclusively 12 per cent chrome alloys. The higher cost of these alloys is justified by the high installation labor cost and reduction of downtime on the unit, both of which favor the use of those alloys which are sufficiently resistant to avoid frequent liner repairs and renewals.

Ganister and brick liners were installed in the main fractionator and strippers, respectively, but cracking and spalling were experienced and maintenance was excessive.

Field resistance-welded stainless (14 per cent chrome) liners have been tried, and found to be unsatisfactory; excessive cracking and buckling of the liner was experienced, which permitted corrosion to the vessel behind the liner.

The following vessels are now protected with plug-welded strip liners; cracking main fractionators, cracking flash chambers, cracking L.O. strippers, coking fractionator, coking stripper and coke chambers. The coke-chamber installations, which are in the most severe service from the standpoint of buckling due to temperature variations, have been in place up to 4 years with satisfactory results. These installations employed Type 405 strips, 0.019 in. thick and 3 in. wide, having ⅞-in. diameter plug welds on 1½-in. centers. The selection of strip and plug-weld dimensions is based on the results of extensive tests conducted by A. O. Smith Corp. These tests duplicated in so far as practicable the temperature cycles in our coking operations, and prove rather conclusively that plug welds were nec-

(Continued on page 97)

Front Lines in

REFINING

by Arch L. Foster

Cyclohexylamine to Stop Steam Corrosion

CYCLOHEXYLAMINE when added to boiler water or to steam reduces corrosion considerably, U. S. Bureau of Mines technologists report, but the process requires too much makeup amine to be effective, they have found, so far in the investigation. A preliminary report shows the results of adding various quantities of the amine to government-operated steam heating systems, in which it is found that 75 per cent of the makeup amine required escapes from steam-system vents and in the deaerator because of the high volatility of the reagent.

It is necessary to add enough amine to neutralize not only the CO_2 present in the steam, but that remaining in the condensate and that also in the makeup water, as represented by carbonates and bicarbonates dissolved therein. Addition of the amine to boiler-feed water showed that the reagent soon finds its way in large concentration to the steam lines, in which for a time after addition of the amine a high percentage of neutralizer is found, followed by periods when the steam is acid, not having enough of the amine, and is therefore corrosive to containers and conduit piping in the system.

A New Friedel & Crafts Catalyst

INTRODUCED more than a year ago, it is still news to most of us that gallium chloride, $GaCl_3$, is an excellent catalyst to further the Friedel & Crafts condensation reaction between aromatics, cyclics or isoparaffins and olefins, alkyl halides, etc. This chloride adds on organic radicals as do the other metal halides of this class, such as aluminum, iron, tin, titanium, zinc, boron, beryllium, etc.

The mechanism of the reaction probably runs through the complexes $GaCl_3$-C_6H_6, which appears to be relatively inactive, and $GaCl_3$-C_6H_7Cl—when reacting propyl chloride—which is the reactive component, to combine the two organic nuclei finally into propyl benzene. Gallium chloride gives greater velocity to the reaction, it is reported, than does aluminum chloride, probably because of the greater solubility of the gallium salt. Friedel & Crafts reactions begin at maximum velocity with the gallium catalyst, and the rate of reaction decreases gradually. The gallium catalyst is less easily deactivated than is aluminum chloride. It is to be expected that qualitative differences will be found between the action of gallium chloride and the aluminum and other chloride catalysts of this group, and that this catalyst may make possible many syntheses which are not practicable with the older known catalysts because of this difference in nature of reactions produced. This catalyst, then, should offer interesting possibilities in both the Friedel & Crafts reaction and in other reactions in which aluminum chloride is now used. Gallium is found as an impurity in crude aluminum, and in such ores, and may be recovered by electrolytic refining and purification methods.

Propane as a "Reducing Unit?"

PROPANE, reduced to a liquid by compression and self-refrigeration, has been used for years as a dewaxing agent, and for various other purposes, such as removal of resins and asphaltic material from residual crude fractions. One of the newest applications of this solvent is for the removal of heavy, carbon-depositing asphaltic materials from crude residua to prepare clean stocks for catalytic or thermal cracking.

Such a unit is installed in the new Cities Service Refining Corp.'s plant at Lake Charles, La. (See The Oil and Gas Journal, July 8, 1944, page 99). The asphalt and salt present are removed at 525 lb. pressure and a temperature of 140°-185° F., using four parts of propane liquid to one part of residuum. These conditions doubtless have been fitted to the crudes processed, to make the deasphalted gas oil desired for this individual plant's purposes. Other crudes, other residual fractions, and other purposes for the product would undoubtedly call for different handling to make the required product. However, the system, and the separation principle may offer solutions of problems of obtaining the maximum yield of stock chargeable profitably to thermal or catalytic cracking units or for other purposes such as making top-flight lubricating oils.

To make the postwar catalytic cracker perform under economic controls in a profitable manner offers some obstacles for many refiners, technologists claim. This process of propane "topping" of crude residuals will bear watching and investigation.

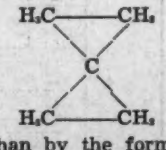
Catalytic Refining of Aviation Fuels

TREATING raw gasoline with boron trifluoride or hydrogen fluoride as catalysts is one of the latest developments patented in the U. S. Patent Office. This patent, No. 2,356,357, was issued to C. H. Schlesman and J. H. McCracken, late in August, assigned to Socony-Vacuum Oil Co., Inc.

The raw gasoline, relatively high in olefin content, is treated with the catalyst or a combination of the two catalysts mentioned, at 300°-500° F., and under 1,000 to 1,500 p.s.i. pressure, according to the claims. The treatment, it is asserted, reduces greatly the acid heat of the gasoline, a condition of primary importance especially for aviation fuels. This means essentially that the olefin content of the fuel is reduced greatly, either by saturation or by polymerization to heavier products which may be eliminated from the final product by distillation. Little has been published about the use of boron fluoride as a catalyst although it has been studied extensively in research laboratories and is said to show some unusual results. Boron trifluoride, BF_3, is a gas at ordinary temperatures, boiling at —101° C., (—149.8° F.), while hydrogen fluoride, HF, boils at 67° F., or about room temperature.

CORRECTION

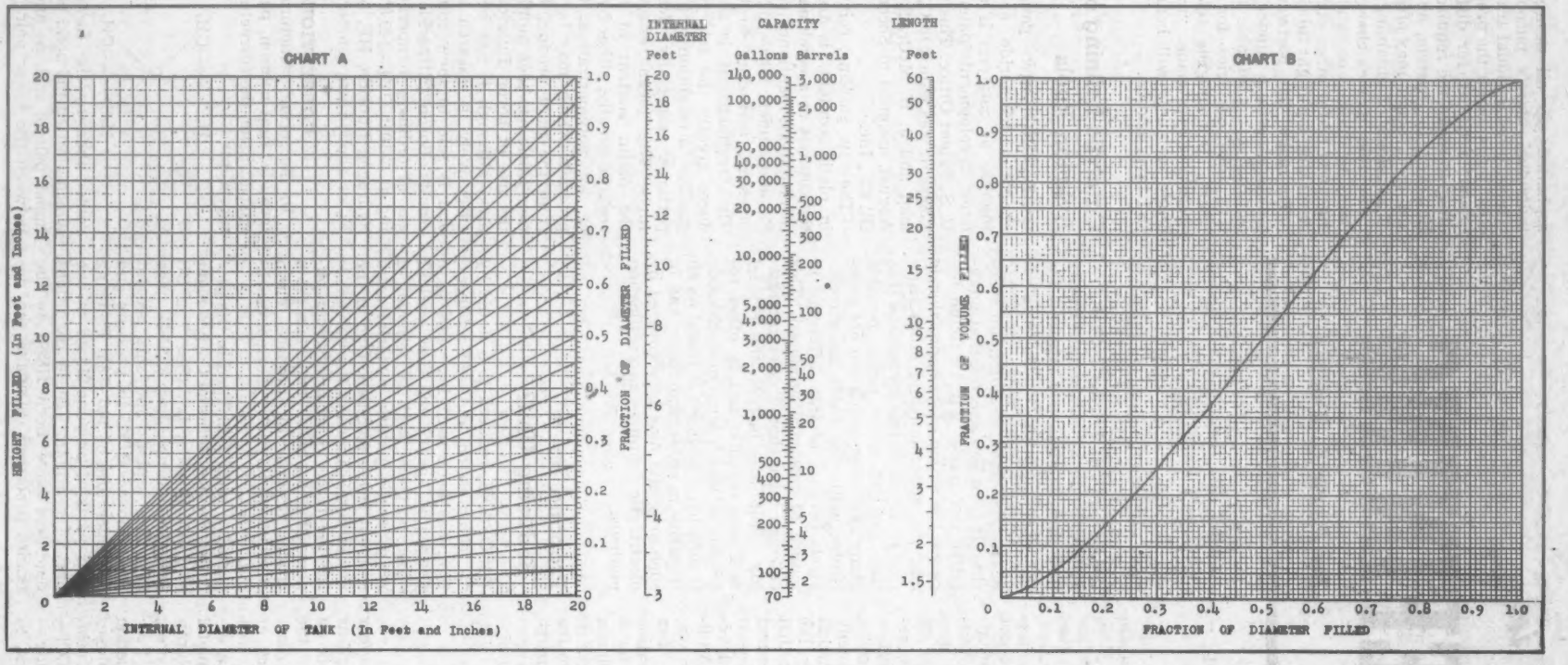
In the second structural chemical formula, first column, page 69, August 12 issue, the correct structure is represented by



rather than by the formula given, which omitted the bond between the upper pair of carbons and also that between the lower pair.

Capacity Charts for Horizontal Cylindrical Tanks

Copyright 1944, Louis T. Monson



THE accompanying illustration shows several charts for determining the capacity of horizontal cylindrical tanks, prepared by Louis T. Monson, research engineer of the Tretolite Co, of California.

To determine the volume of liquid in any partially filled tank whose diameter lies between 3 ft. and 20 ft. and whose length is 60 ft. or less, first measure the height of liquid in the tank. On the bottom scale of Chart A, locate the tank's internal diameter; and on the left-hand scale locate the height filled. Project these points along the coordinates; and through their point of intersection and the 0 point of the chart draw a line to the right-hand margin of the chart, where the fraction of the diameter filled will be found.

Second, on the bottom scale of Chart B, locate the point representing the fraction of the diameter filled, as just determined. Project this point upward to the curve, and then to the left-hand scale of the chart to obtain the fraction of the tank volume filled by the liquid.

Next, determine the total volume of the tank from the center scales by laying a straightedge from the internal diameter of the tank (on the left-hand scale) to the tank length (on the right-hand scale). Read the tank volume, in gallons or in 42-gal. oil barrels, on the middle scale.

Finally, multiply the tank volume, just determined by the fraction of the volume filled by the liquid, to obtain the volume of the liquid, in gallons or barrels.

For example, if a tank 10 ft. in diameter and 34 ft. long contains 4 ft. 6 in. of gasoline, the volume of the latter may be estimated. From Chart A, 4 ft. 6in. of gasoline represents 0.45 of the 10-ft. diameter. From Chart B, when 0.45 of the diameter is filled, 0.435 of the tank volume is filled. From the center scales, a tank of the given dimensions will contain approximately 20,000 gal. when full. The volume of gasoline is therefore 0.435 × 20,000, or 8,700 gal.

To calibrate a rod for use in gaging such a tank, the above operations are reversed. The tank volume is found from the center scales. The fraction of the tank diameter filled by any desired fraction of the total tank volume is found by projecting a line from the proper point on the left-hand scale of Chart B to the curve of that chart and then downward to the bottom scale. From the right-hand and bottom scales of Chart A, the desired point representing the height filled by that fraction of the total volume may be found on the left-hand scale of Chart A.

No provision had been made for tanks having dished, conical, or other-shaped end sections. The designs available are so many and varied as to lie outside scope of these charts.

Large reproductions of these charts may be obtained by addressing the author and company (Louis T. Monson, at the Tretolite Co. of California), 5515 Telegraph Road, Los Angeles 22, Calif., without obligation.

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PRACTICAL REFINERY ENGINEERING

No. 15—Fouling Resistances

by Paul Buthod and B. W. Whiteley

Reduction in the amount of heat transfer due to fouling of heat-exchanger surfaces is discussed in this article. Fouling resistances for various refinery fluids are given in tabular form. The per cent of clean rate heat transferred versus the clean coefficient for varying degrees of fouling is plotted to show the importance of fouling conditions.

IF heat exchangers could be relied upon to perform according to calculated clean rates, both design and operation of this equipment would be greatly simplified. That such is not the case is readily apparent from actual performance characteristics of heat exchangers under varying conditions of operation.

Fouling of the heat-exchange surface may appreciably reduce the amount of heat transfer. This fouling places an additional barrier to the flow of heat and in some instances may act as the controlling resistance, thus effectively limiting the quantity of heat transferred. By a process of actual deposition, a fouling substance may act as an insulating material, through which the heat must flow by conduction. Such deposition may also affect the velocity distribution near the film boundary, thus increasing the effective thickness of the fluid film at the heat-exchange surface.

Regardless of the processes involved, the net result of the fouling condition is to reduce the heat-transfer rate. The actual reduction in the heat-transfer rate depends upon the conditions of operation and fluids used in the system, and consequently fouling resistances must be estimated using experience as a yardstick.

Since the degree of fouling is a function of the time of operation, it progressively becomes more severe and in some instances the fluid passageway may become completely plugged with the material. It is thus evident that with a large number of cleanouts, the theoretical clean heat-transfer rate can be closely approached. On the other hand, if the equipment is not cleaned at all, the effective heat-transfer rate may approach zero. The actual time interval between cleanouts is largely an economic problem associated with investment and operating costs.

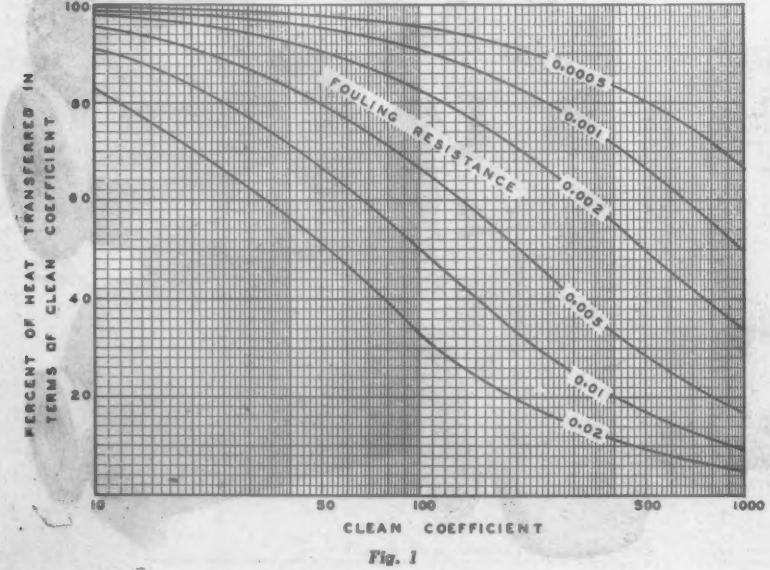


Fig. 1

Due to the wide variety and types of fluids handled in the refinery, accurate figures for fouling resistance must often be determined from existent operating conditions. However, for most practical purposes, the fouling resistance can be estimated with a sufficient degree of accuracy.

Fouling resistances for different types of operation and typical fluids handled in the refinery are shown in Table 1. The values shown in the table are recommended by the tubular section of the Heat Exchange Institute and represent the combined experience of a number of manufacturers.

Fouling Factor

In calculating the heat-transfer rate, fouling resistances for both sides of the heat-exchange surface should be added to the fluid film and metal wall resistances, or:

$$1/U = R_T = R_1 + R_2 + R_3 + R_4 + R_5$$

It should be noted that the fouling resistances in Table 1 are not the maximum values which may occur in actual practice but represent figures which if considered in the design and selection of the exchanger will allow sufficient excess surface for reasonable periods of operation between cleanouts.

Due to the properties of petroleum liquids handled in the refinery, calculated clean heat-transfer rates are usually of a low or medium range of values and the effect of fouling resistances is not so pronounced as in the higher range.

This effect is shown graphically in Fig. 1 where the per cent of heat transferred in terms of the clean rate has been plotted against the clean coefficient for varying degrees of fouling. It will be noted that for a clean coefficient of 50 B.t.u./hr.-sq. ft.-°F., a fouling resistance of 0.005 reduces the heat transfer to approximately 80 per cent of the clean rate. However, with a clean coefficient of 500 B.t.u./hr.-sq. ft.-°F., the same amount of fouling reduces the heat transfer to only 28 per cent of the clean rate.

This illustration serves to emphasize the importance of fouling conditions in those operations where the calculated clean coefficient may

be quite high. In particular, fouling rates encountered with water are usually of major importance since the clean rate may be quite high and the fouling resistance may be of appreciable magnitude.

A typical calculation, involving fouling resistances, is illustrated in the following example:

Example 1.—A topping plant in a refinery handles a Mid-Continent crude oil feed of 3,000 bbl. per day. It produces gasoline overhead, and kerosene, diesel fuel and gas oil sidestreams, leaving a reduced crude-oil bottom product. The diesel fuel amounts to 15 per cent of the crude and is to be cooled from 400° F. to 150° F. before going to storage. The A.P.I. gravity of the diesel fuel is 35° and the estimated average viscosity is 0.8 centipoises.

Assumed Conditions

The cooling fluid is relatively clean river water which is available at 80° F. and is to be heated to 120° F. Tubular heat exchangers, constructed with 44 tubes (⅝-in. 16-gage) arranged in a single pass, and an 8-in. shell with crossflow baffles spaced at 6 in. are to be used. The tubes are 10 ft. long and the exchanger is designed with a single-shell pass. The oil will flow through the shell side. Determine the required number of heat exchangers in series.

Solution.—The amount of water required for cooling is obtained from a heat balance and is:

$$W_w = 19{,}600 \text{ lb./hr.}$$

(See Article 14 of this series)

The film resistance on the water side (tube side) is:

$$R_i = 0.002 \times 625/495 = 0.0025$$

(See Article 5 of this series)

The metal wall resistance is:

$$R_w = 0.00007$$

(See Article 1 of this series)

The film resistance on the oil side (shell side) is:

$$R_o = 0.005$$

(See Article 10 of this series)

The fouling resistance for the oil side would come under the heading of an atmospheric distillation unit, sidestream cut and from Table 1 is:

$$R_i = 0.001$$

The water side fouling resistance from Table 1 (river water minimum) is:

$$R_o = 0.002$$

The over-all heat transfer coefficient is:

$$U = 1/(0.0025+0.00007+0.005+0.001+0.002) = 94 \text{ B.t.u./hr.-sq. ft.-°F.}$$

The true mean temperature difference is:

$$\Delta t = 151° \text{ F.}$$

(See Article 2 of this series)

The heat to be transferred is:

$$q = 784{,}000 \text{ B.t.u./hr.}$$

(See Article 14 of this series)

The required heat exchange surface is:

$$A = 784{,}000/151 \times 94 = 55 \text{ sq. ft.}$$

The available surface area in a single exchanger is:

$$A = 44 \times 0.1636 \times 10 = 72 \text{ sq. ft.}$$

A single unit, then, will provide ample surface for the required conditions.

TABLE 1—FOULING RESISTANCES FOR VARIOUS FLUIDS HANDLED IN THE REFINERY*

(a) Water

Temperature of heating medium:	Up to 240° F.		240°-400° F.	
Temperature of water:	125° F. or less		Over 125° F.	
	Water velocity			
Types of water—	3 ft./sec. and less	Over 3 ft./sec.	3 ft./sec. and less	Over 3 ft./sec.
Sea water	0.0005	0.0005	0.001	0.001
Spray-pond water:				
Treated makeup	0.001	0.001	0.002	0.002
Untreated	0.004	0.003	0.006	0.005
City or well water	0.001	0.001	0.002	0.002
River water, minimum	0.002	0.001	0.003	0.002
Muddy or silty water	0.003	0.002	0.004	0.003
Hard (over 15 gr./gal.)	0.003	0.003	0.005	0.005
Distilled water	0.0005	0.0005	0.0005	0.0005
Treated boiler feed water	0.001	0.0005	0.002	0.001

(b) Atmospheric Distillation Units

Residual bottoms, less than 25° A.P.I.	0.005
Distillate bottoms, 25° A.P.I. or above	0.002
Sidestream cuts	0.001

(c) Vacuum Distillation Units

Residual bottoms, less than 20° A.P.I.	0.005
Distillate bottoms, over 20° A.P.I.	0.002

(d) Cracking Units

Gas-oil feed:	
Under 500° F.	0.002
500° F. and over	0.003
Naphtha feed:	
Under 500° F.	0.002
500° F. and over	0.004
Residuum	0.010

(e) Absorption Units

	Oil-field natural-gasoline plants	Refinery vapor-recovery plants
Gas	0.002	0.003
Rich oil	0.001	0.002
Lean oil	0.002	0.003
O.H. vapors	0.0005	0.001
Gasoline	0.0005	0.0005

(f) Natural Gasoline Stabilizer Units

Feed	0.0005
O.H. vapors	0.0005
Product coolers and exchangers	0.0005
Product reboilers	0.001

(g) Debutanizer

Feed	0.001
O.H. vapors	0.001
Product coolers	0.001
Product reboilers	0.002

(h) Lube Treating Units

Solvent oil-mixed feed	0.002
O.H. vapors	0.001
Refined oil	0.001
Refined oil-heat exchangers water cooled	0.003
Gums and tars	0.010
Solvent	0.001

(i) Dewaxing Units

Lube oil	0.001
Solvent	0.001
Oil wax mix heating	0.001
Oil wax mix cooling	0.003

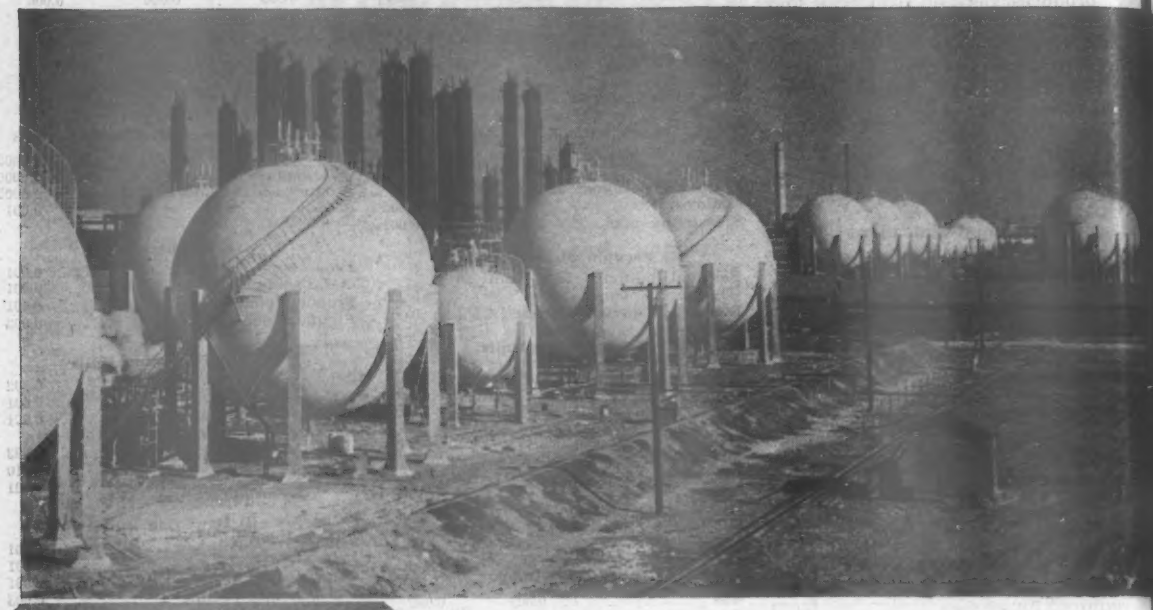
(j) Crude Streams

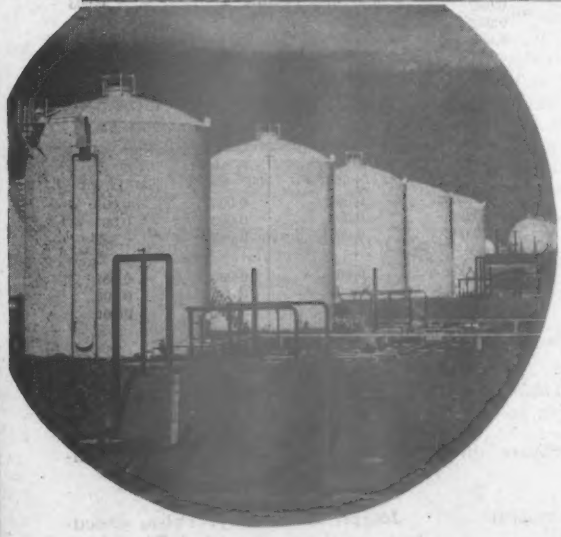
	Temperatures			
Dry crude:	0°-199° F.	200°-299° F.	300°-499° F.	500° F. and over
Vel., under 2 ft./sec.	0.003	0.003	0.004	0.005
Vel., 2-4 ft./sec.	0.002	0.002	0.003	0.004
Vel., 4 ft./sec. and over	0.002	0.002	0.002	0.003
Wet crude (not dehydrated):				
Vel., under 2 ft./sec.	0.003	0.005	0.006	0.007
Vel., 2-4 ft./sec.	0.002	0.004	0.005	0.006
Vel., 4 ft./sec. and over	0.002	0.004	0.004	0.005

*Standards of Heat Exchange Institute, Tubular Exchanger Section, 1937.

Joseph A. Skelley, Tulsa, executive assistant, Stanolind Pipe Line Co., resigned October 1 to engage in the real estate business. Except for World War I service, he has been continuously with the Stanolind organization which was known as Sinclair-Cudahy Pipe Line Co. when he first joined it as a clerk in the right-of-way department. He was transferred to the executive department during operation under Sinclair Pipe Line Co. management.

FORTY-TWO HORTONSPHERES.





The views on these two pages show some of the Hortonspheres and flat-bottom tanks which we built at the Port Neches plant.

The illustration directly above shows 18 of the 42 Hortonspheres at this plant. At the left are a few of the flat-bottom storage tanks we erected.

The Hortonspheres shown in the circular view at the top of the opposite page measure 40½ ft. in diam. and were designed to operate at 75 lbs. per sq. in. pressure. The group of Hortonspheres in the large view on the opposite page are all 40½ ft. in diam. Some of them were designed for an operating pressure of 40 lbs. per sq. in. and the others operate at 75 lbs. per sq. in.

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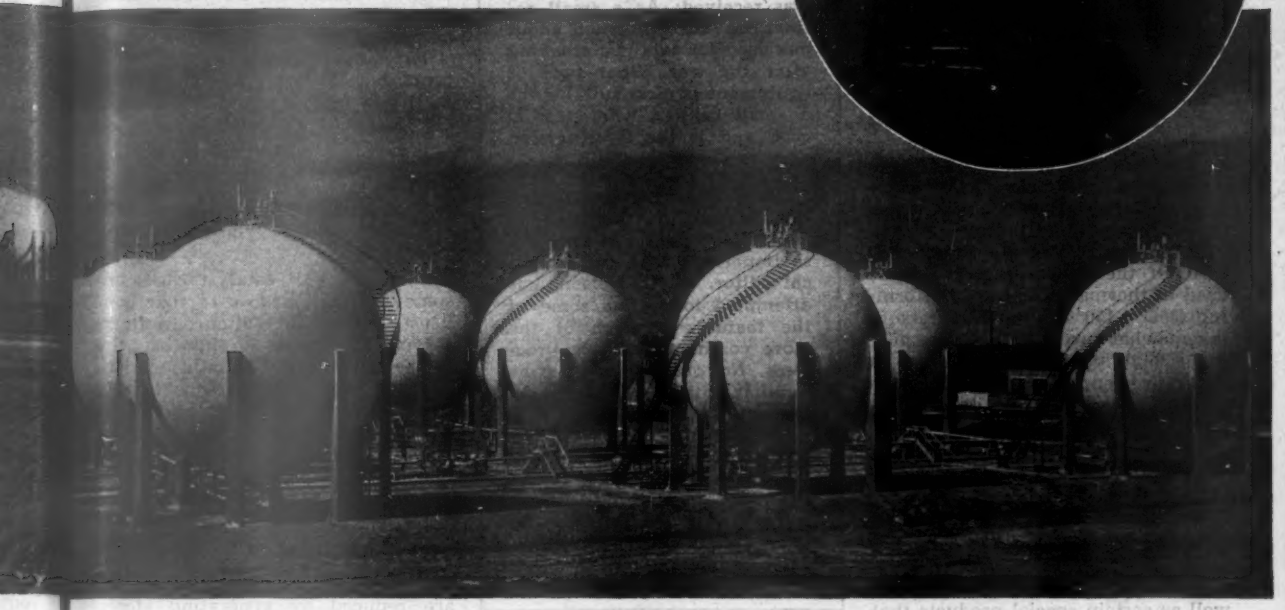
Plants at BIRMINGHAM, CHICAGO and GREENVILLE, PENNA.

. . . . . at world's largest butadiene-from-petroleum plant



Up from 314 acres of Texas prairie recently sprung the world's largest "butadiene-from-petroleum" *factory*. . . . The Neches Butane Products Co.'s Port Neches plant. The story of this gigantic addition to the synthetic rubber industry is a story of the pooling of the skills, knowledge and facilities of America's leading consulting engineers, refinery chemists and equipment manufacturers.

Among the primary items in this plant are forty-two Hortonspheres. The largest of these pressure spheres have a capacity of 12,000 bbls. each and the total capacity represents the largest amount of pressure storage in spheres at any one location!

Raw feed stock for the butadiene plant, obtained from nearby refineries, is delivered to the plant by pipe lines. This gaseous substance referred to as butane-butylene feed, is actually a mixture of normal butane, isobutane, normal butylene and isobutylene. To assure a constant supply of this feed stock at the plant it is stored in the Hortonspheres under pressure.

Hortonspheres are widely used for the storing of many volatile liquids and gases. They are designed to withstand pressures built up in the vapor space at normal temperatures without venting. Not only do these vessels prevent evaporation but they also protect the inherent quality of the product stored.

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QUESTIONS on TECHNOLOGY

by W. L. Nelson
Consulting Engineer

Catalytic Cracking and The Small Refiner

The following vital question was received: As a small refiner we are concerned about our need for catalytic cracking after the war. What type of equipment is most suitable for a small refiner, what does it cost, and is the Cycloversion process a good one?—B. L. C.

These questions are beyond the scope of the Questions on Technology page but they are so important that our technical editor, W. L. Nelson, has attempted to outline some of the features of each of the more common catalytic processes. No one person can be familiar with the details of all these processes because they are still being developed, because of the secrecy of military operations, and because of the enormity of catalytic development. Latest details should be sought from construction companies and licensors.

SO-CALLED catalytic cracking is a process of thermal decomposition conducted in the presence of catalytic or adsorbent solids. The catalysts act most strongly as adsorbents in removing reactive or tarlike materials in the form of coke or carbon on the surface of the catalyst, but they also affect the quality of the gasoline to some extent. The temperature employed extends through the same range as those used in thermal cracking or reforming (850°-1,150° F.) but the pressure is somewhat lower. In thermal cracking a high pressure is required in order to keep tarlike material from forming coke in the still tubes, whereas in catalytic operations the catalyst removes the tarlike material.

Why Catalytic Cracking?

The real advantage of catalytic cracking is the production of superior octane-number engine fuels, as well as certain special products that may be useful because of their high content of aromatic hydrocarbons, or of olefin hydrocarbons such as isobutylene. As against this major and compelling advantage, the difficulty and expense of regenerating the catalyst (eliminating coke or tarlike material) and the disadvantages of large capital investment are also very real. Investments are disproportionately large for small operators. Little cost information is available but some idea may be gained from Houdry cost figures[19] and Thermal cost figures,[15] both prewar:

PLANT INVESTMENT COSTS PER DAILY BARREL OF CHARGE

Capacity, b.p.d.	Thermal	Houdry
1,000- 5,000	$70-$110	.....
8,000-16,000	$50- $65	$195-$365

From general talk, and particularly since the war started, it seems that many catalytic cracking plants cost much more than the above figures, even approaching $600 per daily barrel. Over a long period of time these investment charges are not as bad as they may look—only a fraction of a cent per gallon for large plants. With small plants the investment charge might amount to several cents a gallon.

The heater for catalytic cracking is much smaller than conventional thermal stills because catalytic cracking is usually a once-through operation. Thus, a 6,000-bbl. thermal still (a 1,500-bbl. cracking plant) would handle 10,000 or even 20,000 bbl. in some catalytic processes. The amount of fractionating equipment required for catalytic cracking is also relatively small, i.e., the towers of a 1,500-bbl. thermal unit could handle 3,500-5,000 bbl. of catalytically cracked products.

The different methods of regenerating the catalyst may be grouped as shown in Fig. 1 into three broad classifications:

1. Fixed bed: Houdry, Cycloversion and Hydroforming.
2. Circulating: Fluid and Thermofor catalytic cracking.
3. Once-through: Suspensoid and similar.

Houdry[4 20 21 23 25] catalyst cases are somewhat similar to a tubular condenser in which molten salt flows through the tubes to increase the temperature during reaction and to reduce the temperature while air burns carbon from the catalyst. Catalyst is packed around the tubes. Activity of the catalyst is reduced during 10-15 minutes of operation and hence an elaborate automatic valve system is required to conduct the cycle of reaction, evacuation of vapor, burning of carbon, and evacuation of air. Heat and energy losses are reduced by generating steam from heat in the molten salt, and by expanding the hot flue gases through a turbine which compresses the air used in burning. The automatic-valve system, salt-circulation system, catalyst cases, and turbo compressor system are expensive.

Cycloversion[25] also uses a fixed-bed catalyst but the bed is cooled during the reaction by introducing steam or gas at many points. During burning, the temperature is kept down by introduction of steam or flue gas. The catalyst stays active for 3 to 6 hours and hence manual control is satisfactory. Much steam

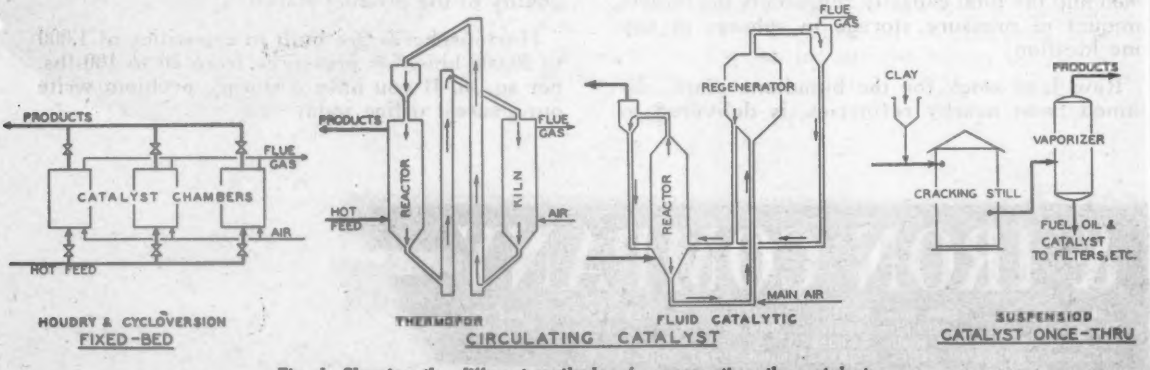

Fig. 1: Showing the different methods of regenerating the catalyst

is required with heavy gas oils in order to keep them in the vapor state. Waste-heat boilers for saving heat from the flue gas and from the product, and the catalyst chambers, are expensive.

The **Fluid Catalytic**[6,7,9,9] system involves recirculation of catalyst dust through the reaction zone and through a regeneration chamber where carbon is removed by burning it with air. The fine catalyst is circulated by blowing or fluffing it with air, and at a few places with steam or gas. Heat is saved in the newest plants by exchange between the catalyst and the charge stock. Dust is recovered from the flue gas by means of a Cottrell precipitator. Oil must be stripped from the catalyst at the bottom of the reactor by means of steam. The dust-blowing equipment, the multitude of valves for blowing the catalyst, air compressors, and Cottrell precipitator are expensive.

Thermofor[2,3,4,5] catalytic cracking (T.C.C.) is conducted in much the same way as the Fluid catalytic process except that pellets or beads of catalyst are employed and the beads are fed through the reaction zone and regeneration kiln by gravity, and are lifted to the tops of these equipments by conveyor systems. The conveyor system and air blowing system are expensive.

Suspensoid[11] and similar processes[10] involve the once-through use of the catalyst except that it can possibly be recovered by filters or similar means and regenerated in conventional clay-burning equipment. The catalyst is mixed as a slurry with the oil as it is pumped through a conventional cracking plant. Except for one successfully operating commercial plant, these processes are more the "wishful thinking" of small refiners than real processes.

Hydroforming[14,15] is not adequately discussed in the literature. Details of the fixed-bed catalyst chambers or their operation are not disclosed. The process involves reforming of naphtha vapor in the presence of hydrogen and a catalyst.

Charge Stock and Yields

Stocks that are low in carbon have thus far been necesasry because of the exorbitant costs of regeneration for such stocks as reduced crude oil, residues, recycle stocks or very heavy gas oils. Thus straightrun naphthas and gas oils are suitable charge stocks. Only the Hydroforming process is limited to a naphtha charge stock. In general, naphthene base charge stocks are superior for gasoline production and paraffinic gas oils are best for the production of diesel fuels.

Other advantages and disadvantages, or ramifications of the above main factors will be listed although it is feared that the situation will be confused thereby:

1. Low pressure (10-100 lb. ga.). In thermal units the vaporizer or reaction chamber operates at 25-300 lb. The pump pressure is also somewhat lower in catalytic pipe stills.

2. Olefin-rich gases are produced and usually in larger amounts than in thermal plants. These gases are a disadvantage unless the refiner is equipped to process them into valuable products.

3. Aromatic stocks are valuable for high-solvency naphthas but such a market is not great.

4. No residual fuel oil is produced but this requires the removal of carbon from the catalyst at great expense.

TABLE 1—YIELDS BY CATALYTIC CRACKING

Process—	T.C.C.		Fluid						Houdry				Cycloversion		Suspensoid	
Reference	2	2	6	6	6	6	6	6	13	16	16	16	17	17	18	18
Charge stock, A.P.I.	30.3	33.6	..	..	31	33.5	**25.5	22	..	17.2	35.7	46.8	..	..	..	..
Charge stock, °F.	420-640	440-700	..	..	450-965	480-700	†480	478-972	..	..	..	..	..	..	..	..
Gasoline, per cent	62.7	54.1	*38	45	48	42.5	43.3	50.0	38-50	49.4	†39.1	83.42	30.3	35.4	52.3	58.6
Butanes (excess), per cent	..	..	..	..	7.6	11.5	7.5	6.0	..	..	..	..	3.8	11.58	4.5	nil
Recycle oil, total per cent	..	..	35	42	41	44	45	41.5	42-62	51.0	†11.4	9.1	63.55	20.24	§32.9	§32.9
Gas, per cent by weight	..	..	11.2	6.5	6.6	8.8	6.4	8.4	..	4.9	5.4	..	..	(‡)	12.5	10.5
Coke or carbon, per cent by weight	..	..	6.0	5.5	5.7	5.0	6.6	4.2	..	4.4	..	..	1.2	8.3	..	..
Gasoline properties:																
A.P.I. gravity	54.2	60.6	..	..	60.0	61.0	58.5	57.0	..	53.4	64.4	57.8	..	..	..	..
R.V.P.	10.1	9.6	..	..	9.9	10.0	10.1	10.0	..	..	..	..	10	10	10	10
End point	406	400	400	400	400	400	400	400	..	420	392	392	..	..	400	400
O.N. motor	80.8	78.7	..	..	80.5	81.3	79.1	80.5	74-76	79.0	80.9	76.5	..	..	73.2	75.5
O.N. research	86.7	84.9	..	..	92.0	94.0	93.8	92.9	..	..	..	..	..	..	82.0	85.1
O.N. with 3 cc. TEL	96.6	94.7	..	..	..	..	..	..	..	..	..	..	..	..	91.4	93.2

*Aviation gasoline and motor naphtha. **50 per cent reduced crude from East Texas. †Also 50.2 per cent motor naphtha 452 end point. ‡1,486 cu. ft. per barrel. §Heating oil and 10 A.P.I. fuel oil.

TABLE 2—PROPERTIES OF CATALYTIC CRACKING

Process—	T.C.C.		Fluid			Houdry*	Cycloversion*	Hydroforming
Reference	5	5	7	7	7	12	17	15
Charge stock	Para. G.O.	Naph. G.O.	..	31.7 G.O.	22.3 G.O.	..	31.5-39.5 G.O.	51.4 Gaso.
A.P.I. gravity	60.6	52.7	60.3	60.5	58.2	53-64	47.5 and up	51.3
R.V.P.	9.6	9.5	10	10	10	7½-12	5.7-10	8.2
Gum, copper dish	16	10	..	..	..	..	....	..
Ind. period	12½	8½	..	9	13	10 plus	....	..
Oct. No. motor	76.9	82	79.2	80.5	77.9	77.4-81.2	78.6-82.3	77.0
Oct. No. with 1½ cc. TEL	..	..	..	84.6	81.2	..	81.4-86**	..
Oct. No. with 3 cc. TEL	..	..	..	..	..	84.9-90.1	....	..
Oct. No. research	84.1	92	92.9	92	91.3	85.2-91.5	91.3-95	..
Oct. No. with 1½ cc. TEL	..	..	97.3	97	95.3	..	94.2-97.6**	..
Oct. No. with 3 cc. TEL	95.1	99.2	..	..	..	95.0-98.4	....	..
10 per cent point, °F.	110	110	..	..	..	112-148	....	174
50 per cent point, °F.	243	267	..	..	..	209-271	....	270
90 per cent point, °F.	376	369	..	..	..	340-398	....	339
End point, °F.	404	410	..	406	401	390-446	400-405	368
Hydrocarbons	....	....	(§)	(§)	(§)	..	(†)	(‡)

*A summary of all values. **Only 1 cc. TEL. †65-83 per cent olefins. ‡40-50 per cent aromatics. §Reference 9 shows 28-80 per cent aromatics.

5. Larger total yields if catalytic and thermal cracking are combined. The increased yield of gasoline and gas comes from the smaller fuel-oil yield.

6. Sulfur and gum are reduced.

7. At present, reduced crudes and carbon-rich stocks cannot be handled because of the cost of regenerating the catalyst.

8. Diesel fuels from some catalytic processes are satisfactory, but the same mild degree of cracking in thermal plants will also produce satisfactory diesel fuels.

9. Lead susceptibility of most catalytic gasolines is poor but probably slightly superior to thermal stocks of the same clear octane number.

10. Catalytic gasolines require less chemical treatment.

The How of the Process

The real difference in catalytic cracking flow and other conventional fractionating and cracking plant processes is the part of the process that is used for regenerating or handling the catalyst. Thus in a general way a catalytic cracking plant can be thought of as:

1. A heater for the charge stock.
2. Reactor.
3. Fractionating equipment for separating the products, including the recycle gas oil.
4. Catalyst regeneration equipment and auxiliaries.

Yields are much the same by all processes (35-60 per cent once through) and obviously high yields are obtained from high-gravity stocks. Thus, a yield of 80 per cent is claimed[16] for the Hydroforming process when operating on a 51° A.P.I. naphtha. Most of the differences in yields can be attributed to the percentage conversion being practiced, the gravity of the charge stock, and the fact that only pilot-plant yields are stated for some processes. Yields have been tabulated in Table 1.

Properties of Gasoline

Catalytic gasolines are universally lower in sulfur and gum than thermally cracked gasolines. Except for those gasolines that are very rich in olefins, the lead susceptibilities of catalytic gasolines are better than those of thermal gasolines. The A.S.T.M. or 1-C octane numbers (clear) of catalytic gasolines range from 73 to 81 depending more on the degree of conversion or severity of cracking than on the kind of process employed. Research octane numbers are likewise high, ranging from 84 to 97. An attempt is made in Table 2 to compare the properties of catalytic gasolines, but it should be understood that operating conditions and yield of other products should also be shown in order to get the true picture. Such information is seldom in the literature.

Catalysts

Many of the common treating clays have catalytic activity but most of them lose their power if heated to 1,200° F. or higher. Natural-clay catalysts of silica-alumina compositions, aluminum hydrosilicate, and bauxites are being used or have been used in nearly all of the processes. Generally these are not as active nor as strong as synthetic catalysts that have been developed[3,9] but synthetic catalysts cost $240 per ton and even more, whereas the natural clays may cost less than $80 per ton. Strength and freedom from dusting are vital in nearly every process because much of the cost of catalytic cracking arises by the difficulties of recovering the dust, of keeping the beds in position, and of withstanding the wear of handling. Some of the synthetic catalysts are twice as active as natural clays.[11]

Fifteen months of commercial Houdry operation[13] resulted in the use of only 0.065 lb. of catalyst per barrel. In the Fluid catalytic process, the early Baton Rouge plant[7] used an average of 0.4 lb. per barrel; in a newer plant the loss ranged from 0.12-0.26 lb., and it is expected that an average of 0.15 lb. will be attained. The mechanical handling inherent in the Thermofor process at first caused losses of catalyst of 1 lb. per barrel[5] but extremely strong and wear-resistant catalyst beads have been developed[2] which have greatly reduced the catalyst loss.

A loss of 1 lb. per barrel in a 10,000-bbl.-per-day plant amounts to $1,250 per day (for a $250-per-ton catalyst), and $125 per day for a loss of 0.1 lb. per barrel.

Coke Burnoff

The amount of coke or oil that must be burned from the catalyst is also vital because it affects the size of the regeneration, air blowing, etc., equipment required and ultimately fixes the capacity of the plant. Most approximately, a burnoff of 1 per cent of coke permits a capacity 6 times or even 10 times greater than a plant with a 10 per cent burnoff. In addition the amount of coke is a direct loss except for heat that may be recovered from the burnoff gases. In the Cycloversion process[17] the burnoff ranges from 1 to 3 per cent for motor-fuel operations but ranging up to 8.3 per cent when operating for the production of gas. Data on the Houdry process[15] are now old but burnoffs of 4 to 5 per cent are stated. Trouble has been encountered with the stripping of oil from the catalyst in the Fluid catalytic process but at this moment this difficulty is being corrected. This probably accounts for the somewhat high burnoffs of 4.1-6.7 that have been reported.[6] Little is reported[5] on the burnoff in the Thermofor process but it would be expected that it could be smaller than in any of the processes because of the large size of the catalyst and the ease with which oil could be drained or stripped from the catalyst.

Summary

A fair comparison of the several processes cannot be given from published literature alone but some important conclusions seem clear.

1. Little difference among the yields and conditions of operation of the several processes can be seen except that the Suspensoid and Hydroforming processes show large yields.

2. Plant costs appear to be lowest for the Cycloversion and Thermofor processes.

3. Burnoff appears to be lowest in the Thermofor and Cycloversion processes.

4. Catalyst losses may be lowest in the Houdry process.

5. Fluid catalytic seems to produce a superior gasoline.

6. All processes produce much gas and require the construction of additional equipment for processing the gas.

7. Recycling is not now feasible but the cheapest processes may soon be sufficiently improved to permit recycling and the handling of topped crude oil, or the construction of small plants.

8. Aromatic hydrocarbon content appears to be highest by the Hydroforming and Fluid catalytic processes.

9. Olefin hydrocarbon content is highest by the Cycloversion process.

10. The economical capacity of most processes is too large for small refiners.

11. Only the Cycloversion process (perhaps also Hydroforming) now uses a cheap natural catalyst.

The number of plants being built or operating in March 1943 was as follows:

	Built	Building	Total
Houdry	16	10	26
Fluid	3	28	31
T.C.C.	0	20	20

In January 1944, the same information for aviation-gasoline-plant construction by various refiners:[20]

	Built	Building	Total
Houdry	13	3	16
Fluid	5	22	27
T.C.C.	3	11	14
Hydroforming	5	1	6
Cycloversion	..	1	1

In this tabulation it may be that several units are being built in some of the refineries.

Houdry was the first process to be widely used, followed by the Hydroforming and Fluid catalytic processes. Thermofor is an even more recent development and the Cyclo-

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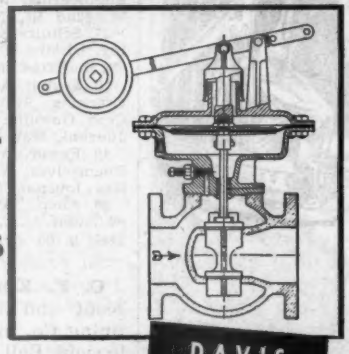

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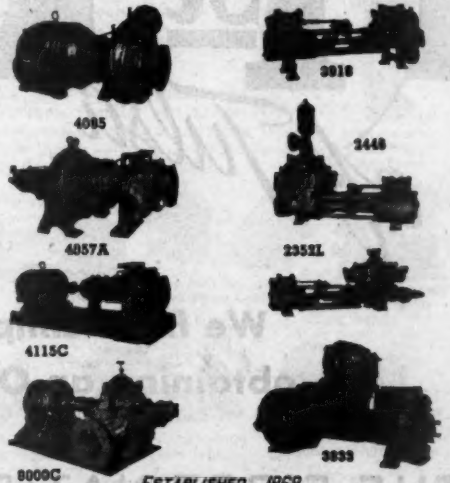

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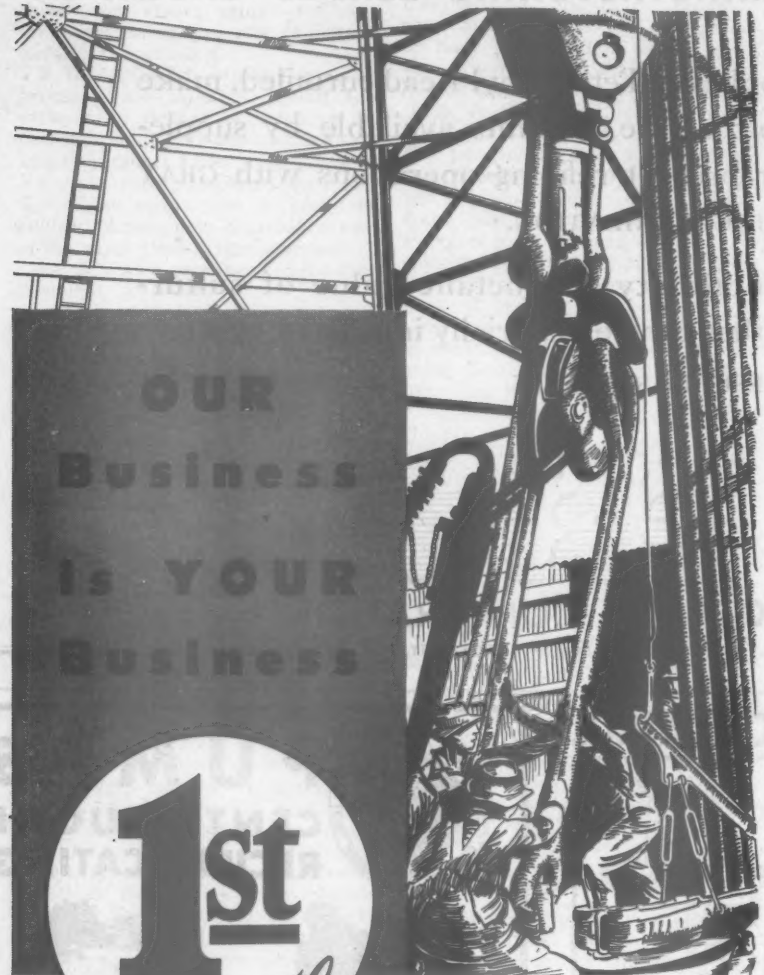

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version process has only recently attracted attention.

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C. F. Kimmell has resigned as scout and landman for Gulf Refining Co. in the Illinois basin area to join Bell Brothers at Robinson, Ill. His place has been taken by **William T. Johnson**, transferred from Mattoon, Ill.

Oscar John Dorwin, general counsel of The Texas Co., has been appointed a member of the American petroleum industries committee of American Petroleum Institute. He succeeds **Col. Harry T. Klein**, former chairman of the committee and now president of The Texas Co.

Joseph N. Gregory, independent oil operator and geologist of San Angelo, Tex., before the war, has been promoted from captain to major at the San Angelo Army air field.

Determining Proper Bearing Adjustment In Engines

IN large engines an efficient method of determining clearance in a bearing is by the procedure known as "taking leads." Assuming that this method is to be used in determining clearance on a main crankshaft bearing, the steps are as follows:

(a) Remove the upper half of the bearing, leaving all shims in place.

(b) Over the exposed half of the journal lay two to six lengths of soft lead wire (depending on the width of the bearing). This lead wire should be about 0.025 in. in diameter or less.

(c) Replace the upper half of the bearing and tighten to operating position.

(d) Remove the upper half of the bearing.

(e) Remove the lead wires one at a time. They will have been flattened to conform to the clearance between journal and bearing.

(f) Measure each lead ribbon with a micrometer at several points. The thicknesses measured will represent the clearance at various points in the bearing.

(g) If the measured width of the ribbons is greater than the desired clearance in the bearing, remove shims equal in thickness to the reduction of clearance required. Example: Assume that leads are taken on a 6-in. shim-type bearing and journal. Micrometer measurements show that the leads have been mashed out quite evenly along their entire length, the average measurement being 0.015 in.

For determining the proper clearance in a well-lubricated bearing it is a good rule of thumb to allow 0.001 in. of clearance for each inch of journal diameter. Thus the proper clearance for a 6-in. bearing would be 0.006 in.

Having determined that the actual bearing clearance is 0.015 or 0.009 in. greater than the desired clearance, it becomes evident that adjustment of the bearing will require removal of shims that total 0.009 in. in thickness at each side of the bearing.

The micrometer must be used to measure the thickness of the shims removed; otherwise the accuracy of the procedure will be lost. Failure to bring the bearing halves up solidly against the shims while "taking leads" will destroy the accuracy of the gage.

If the lead ribbons vary greatly in thickness throughout their length, an uneven bearing surface is indicated, and it will be necessary to scrape down the babbitt metal to obtain a satisfactory fit. A coloring substance, such as Prussian blue, is painted in a thin coat on the journal, or upon a mandrel of diameter exactly equal to that of the journal. The bearing halves are then rotated over the journal or mandrel to mark the high spots. High spots should be marked in this manner and scraped down until at least two-thirds of th bearing surface is taking color. Taking of leads should then be repeated to determine the proper adjustment of shims.

While taking of leads is sometimes useful in gaging clearance of the harder precision-type bearings as well as for the shim-type bearings, no adjustment of precision bearings should be attempted. If the leads indicate that clearance is too great, the precision bearings should be replaced by new inserts.

Processing of West Texas Sour Crudes

(Continued from page 80)

essary to provide adequate heat transfer from the liner to the vessel wall to reduce differential expansion during temperature changes in the coking cycle.

Units Designed for West Texas Operation. — An 18,000-bbl.-per-day once-through cracking and continuous coking unit is in service in this refinery, operating on 100 per cent West Texas reduced crude. This unit, which was designed to handle West Texas reduced crude, was provided with 7 per cent chrome-alloy furnace tubes and 12 per cent chrome-alloy-lined columns. No corrosion difficulties have been experienced.

A quench-oil heat exchanger installation preheating reduced crude charge to this unit was equipped with steel tubes. The average life is less than 2 years. Replacements are now being made with 5 per cent chrome alloy tubes. Quench-oil temperatures are 665° F. inlet and 475° F. outlet; reduced crude temperatures are 375° F. inlet and 460° F. outlet.

Condenser bundles have ¾-in., 14 B.W.G. admiralty tubes. No hydrocarbon-side corrosion is encountered. (It is standard practice to use Muntz metal or naval brass tube sheets with admiralty tubes.)

Typical pump specifications at this unit are listed in Table 4. Liberal use of alloy is made to resist corrosion.

Effect of salt in reduced crude on corrosion.—Some evidence has been obtained to show the effect of salt in the topped crude on the corrosion experienced in cracking operations. This will be discussed in the section on desalting of crude oil.

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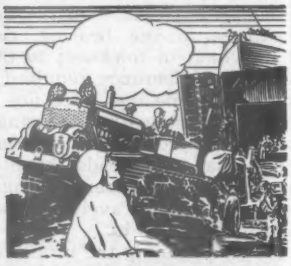

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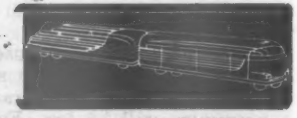

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PROPERTIES AND CHARACTERISTICS OF CRUDE OILS

THE properties and characteristics of crude oil depend upon the relative proportion of light to heavy hydrocarbons present in the oil. If hydrocarbon molecules of small size predominate, the crude will be light or even in the gaseous state at ordinary temperatures and pressures. If the larger or heavier molecules predominate, the oil will be heavier, thicker, more viscous. The character of a crude not only changes with the composition and proportions of the hydrocarbons present but with the temperature and pressure conditions in the reservoir. At a high pressure the hydrocarbons may be all in the form of a liquid and at low pressures partly in the liquid and partly in the gaseous form, as shown in the accompanying table. Therefore, it is important to know the concentrations of the hydrocarbon compounds in the oil and that may change with the varying pressures in the process of production. It is especially important to know the concentration of the volatile constituents. This can only be obtained from an analysis of bottom-hole samples obtained under reservoir conditions. The analysis should consist of the weight and volume percentages of the following gases: Methane, ethane, propane, pentane, butane, and hexane. Also important are the gravity, viscosity, and boiling point of the original oil and of the crude residue. A typical 40° A.P.I. gravity Mid-Continent oil has the following composition:

COMPOSITION OF MID-CONTINENT CRUDE OIL AT DIFFERENT PRESSURES
(Per cent)

	At 3,000-lb. pressure		At 12-lb. pressure	
	Weight	Vol.	Weight	Vol.
Methane	7.0	18.3	0.008	0.02
Ethane	2.4	3.9	0.03	0.06
Propane	3.0	4.2	0.26	4.60
Butane	2.8	3.4	0.90	1.40
Pentane	2.4	2.7	1.70	2.30
Hexane	2.9	3.0	2.50	3.20
Residue	79.5	64.4	94.60	92.50

This is the second installment of this series under Plummer's authorship. The series is in effect an introduction to petroleum engineering. In the next several installments will be described such subjects as: Formation of petroleum in the earth; migration of petroleum and gas and origin of reservoirs; description of oil reservoirs; geology of oil reservoirs; geophysical and geochemical aspects of oil reservoirs; relation of pressure and characteristics of fluids in reservoirs to production of oil and gas; methods of measuring volume of a reservoir and calculating reserves, and reservoir waters.

Liberation of gas from oil during production may be of two types, flash and differential vaporization. In flash vaporization, all the gas or vapor is removed from the liquid at a definite temperature and pressure. In differential vaporization, the gas or vapor is removed continuously from the remaining liquid while changing conditions of temperature or pressure or both prevail. In either case, the tendency of the constituent of the liquid crude oil to vaporize depends on temperature pressure and concentration of the liquids and type of crude oil. In most oil reservoirs a combination of the differential and flash vaporization occurs and usually the former process predominates. In the flow string and separator, flash liberation occurs and equilibrium between liquid and vapor or gas phase is closely approached.

Properties Vital to Production

Properties of crude which are vital to production are: Viscosity, gravity, surface tension, solvent power for paraffin, and pressure exerted by the liquid at a given concentration. Gravity and viscosity are important factors in the movement of oil through the sand or formation and in calculating the size and capacities of oil-well pumps. Adhesion tension and surface tension give the measurements of the adherence and wetting properties of oil to the sand and are factors in the recovery of oil-gas mixtures from any porous formation. The solvent power of a crude for paraffin is important. Insufficient solvent power causes paraffin to precipitate and retard production. The pressure exerted by the gaseous constituents in the liquid is a measure of the ability of the oil to be forced or driven into the well and is a factor in the work or energy available to produce crude oil in gas drive or volumetric reservoirs.

Effect of Gas Liberation

Beecher and Parkhurst, Dow and Calkin, Jones, Mills, and Heithecker, and Lacy have performed experiments to show the effect of gas liberation on properties of crude oil. For example, Lacy showed that at a pressure of 2,400 lb. and a concentration of 45 mol. per cent of gas the viscosity of Santa Fe Springs crude oil was reduced 25 per cent from its original viscosity by the removal of gas. Surface tension of crude oil is reduced also by the presence of gaseous constituents in crude oil. Swartz showed that the surface tension of oil is about one-third as much when saturated with gas at 2,000-lb. pressure as for crude oil under atmospheric conditions. Hence, less energy is required to form new gas from crude oil containing a large amount of gas. Bartell and Miller and Livingston showed that crude oils of lower specific gravity have lower surface and adhesion tensions.

Gas liberation has two effects upon the solubility of paraffin in crude oil: (1) Vaporization reduces

Series prepared by F. B. Plummer, professor, petroleum engineering school, University of Texas

CHARACTERISTICS OF CRUDE OILS IN DIFFERENT ROCK FORMATIONS

	Field and county—	Depth (ft.)	Formation	Gravity	Viscosity Baume °A.P.I.	Per cent: Sulfur	Gasoline: Naphtha	Gasoline: and naphtha	Kerosene	Gas oil	Lube oil: Light	Lube oil: Medium	Lube oil: Heavy	Residuum	Carbon residue	Type of oil
1.	Panhandle, Hutchinson	3,136	Granite wash	34.0	50	0.55	6.6	26.1	15.9	7.9	11.4	6.02	...	32.3	2.7	(*)
2.	Panhandle, Hutchinson	2,899	Limestone	34.4	65	0.60	3.1	22.0	17.1	9.0	12.6	5.03	...	34.2	1.8	(*)
3.	Panhandle, Gray	2,930	Granite wash	42.8	40	0.26	13.2	36.6	15.1	8.3	11.1	3.50	...	23.7	1.3	(*)
4.	Big Lake, Reagan	2,900	Limestone	38.2	40	0.36	9.9	59.5	9.8	13.7	8.8	5.7	3.0	24.9	1.1	(†)
5.	Big Lake, Reagan	8,618	Ordovician lime	46.5	35	0.19	30.5	61.2	13.1	45.4	4.3	2.0	....	8.1	0.2	(*)
6.	Big Lake, Reagan	8,771	Ordovician lime	49.9	34	0.18	13.9	36.5	14.6	45.8	9.2	4.6	...	21.0	0.4	(*)
7.	Crane, Crane	3,000	Limestone	32.3	47	2.37	8.4	28.2	4.8	20.1	9.2	13.4	...	23.6	3.7	(†)
8.	Hendrick, Winkler	2,700	Limestone	30.0	56	1.53	4.4	22.3	5.6	18.4	9.6	6.2	6.5	29.7	2.5	(†)
9.	Yates, Pecos	970	Limestone	30.6	63	1.53	5.1	22.9	5.1	19.0	9.3	9.7	...	31.4	2.9	(*)
10.	Electra, Wichita	1,460	Cisco sand	38.8	41	0.35	11.8	35.8	11.5	13.7	9.8	7.0	...	19.2	2.5	(‡)
11.	Ranger, Eastland	3,400	Marble Falls lime	37.0	40	0.17	5.4	30.2	13.1	15.0	11.4	6.8	1.0	19.5	0.7	(*)
12.	East Texas, Gregg	3,560	Woodbine sand	39.8	43	0.31	12.9	35.0	8.9	15.5	9.1	5.9	...	21.8	1.5	(†)
13.	Wortham, Limestone	2,962	Woodbine sand	39.8	40	0.21	1.7	29.9	28.9	10.1	10.6	4.4	...	15.9	1.2	(‡)
14.	Luling, Caldwell	2,085	Edwards lime	27.7	88	0.92	0.8	13.1	5.1	21.4	12.0	8.0	6.1	33.4	2.3	(†)
15.	Thrall, Williamson	900	Serpentine	37.6	43	0.15	0.0	26.4	20.8	10.4	13.0	6.2	...	20.2	1.1	(*)
16.	Aviators, Webb	1,740	Tertiary sand	22.1	78	0.17	0.0	0.0	0.0	45.6	16.0	3.8	15.1	17.2	0.6	(‡)
17.	Goose Creek, Harris	4,350	Tertiary sand	26.3	61	0.55	0.0	0.0	0.0	51.7	13.2	7.4	7.1	17.6	0.8	(‡)
18.	Government Wells, Duval	2,333	Jackson sand	21.6	81	0.18	0.0	0.0	0.0	47.7	23.1	6.1	16.0	16.8	0.6	(‡)

*Paraffin. †Intermediate. ‡Naphthene. §Paraffin and intermediate.

the volume of the paraffin solvent; (2) the solubility of paraffin changes with the composition of crude oil. The work of Weber and Dunlap and of Reistle indicates that the maximum solubility of paraffin occurs in paraffin hydrocarbons series of about the composition of hexane. The presence of hexane gas in the liquid crude will raise the solubility of the crude for paraffin. The escape of much gas may cause the precipitation of paraffin.

Effect of Pressure

The effect of pressure on oil movements is well known. The energy of the gas to move oil to the well decreases in loss of pressure and is not proportionally restored by restoration of pressure. If a crude that exerts a pressure of 1,000 lb. is allowed to vaporize part of its gas until it reaches a pressure of 900 lb., the resultant crude will exert a pressure of 900 lb. Then if the pressure is raised again to 1,000 lb. it is possible to put some of the gaseous constituents back into the crude with high pressure over a period of time, but not all of them. That this gas returns to the oil to any great extent has been shown to be improbable by Pomroy and Lacy. Hence, gas once lost can never be fully regained.

It is apparent from this discussion on the effect of dissolved gas on the properties of crude oil in a reservoir that a knowledge of the amount of dissolved gas in oil in a reservoir is important, and that also the resulting physical properties of the oil, namely gravity, viscosity, surface tension, and paraffin saturation, need to be known before subsurface problems pertaining to flow can be handled. Accordingly, these properties will be discussed in more detail in following chapters.

In general the paraffin base oils come from the geologically older, more deeply buried sands. The naphthene base oils come from geologically younger formations. Asphalt base oils come from shallow depths and many from limestone formations. For example, the asphalt oils of the Mexican oil fields near Tampico are from limestone formations.

The Refiner's Notebook

A WEEKLY FEATURE OF THE OIL AND GAS JOURNAL

Heating Coils for Tanks

STORAGE tanks, tank cars, vessels, and fuel-oil tanks used for thick oils, waxing oils, or asphalt must be equipped with steam or hot-oil coils. Little heat is required to keep a tank hot, but in order to heat the oil in a reasonably short time the coils must be large. For such emergencies as plant fires or a sudden call for a shipment, the value of rapid heating (oversize coils) is obvious.

The amount of heating surface required is complicated by these many factors:

1. Time of heating.
2. Pour point of oil or oil temperature required.
3. Air temperature and wind velocity.
4. Viscosity of oil (rate of heat transfer).
5. Dirtying or fouling of the steam coil.
6. Steam temperatures.
7. Capacity and shape of tank.

As a tank is heated the first heat raises the temperature of the oil, and little heat is lost through the walls of the tank. As the final high temperature is attained, the heat input shrinks to around one-tenth because only the heat for the losses through the walls is required. At the beginning the oil is thick or viscous and the rate of heat input is small, but the steam is much hotter than the oil, which tends to increase the rate of heat input. The opposite situation exists during the final heating and hence the actual input is somewhat constant during much of the heating. This was found to be true by computations and hence it was assumed in computing the three accompanying figures.

Time of heating is the most important variable. When heating is done in a short time almost the entire heat input goes into heating the oil, whereas, if the tank is warmed over a period of many hours or days the heat input is almost equal to the heat losses.

Little can be done about such factors as wind velocity and fouling of the heating surface, and even the heat-transfer rate for the oil cannot be evaluated with accuracy. For these reasons the charts shown here can be used as approximations only. The charts are very conservative, and new or clean installations will undoubtedly work much better than the charts indicate.

These difficulties have been so great that little is found in handbooks on the amount of heating surface for tanks. H. S. Bell, in American Petroleum Refining (1930), suggests the very low figures of 43 sq. ft. per 1,000 bbl. of 90° F. cold-test oil, and 25 sq. ft. per 1,000 bbl. of 50° F. cold test oil. Solid materials, such as asphalt, require even larger heating coils than shown on any of the accompanying charts. Such materials scarcely circulate in the tank until they are hot. Thus, 10,000-gal. tank cars for asphalt often have 240 to 400 sq. ft. of heating surface in them, but even with such large coils it requires about 20 hours to heat them with 100-lb. (337° F.) steam. After attaining a temperature of 240° F. it then requires about 6 days to cool to within 10° of the atmospheric temperature.

Basis of Charts

The charts are based on the following materials: (1) Gas oil—High-pour-test gas oil or distillate, most crude oils, and light lubes. (2) Lube oils—High-pour-point oils or viscous lubricating oils. (3)—Semisolids—Heavy fuel oil, residuum, heavy topped crude, and very heavy asphalt crude oils, but not asphalt or waxes.

The charts are based on standard tank shapes and sizes, on differences of oil and air temperature ranging from 20° to 150° F., and on no wind or rain. Transfer rates of 5 to 13 were used for semi-solids, 8 to 17 for lube oils, and 12 to 22 for gas oils. It is believed that these rates are conservative and that they account for the normal amount of dirt or fouling of

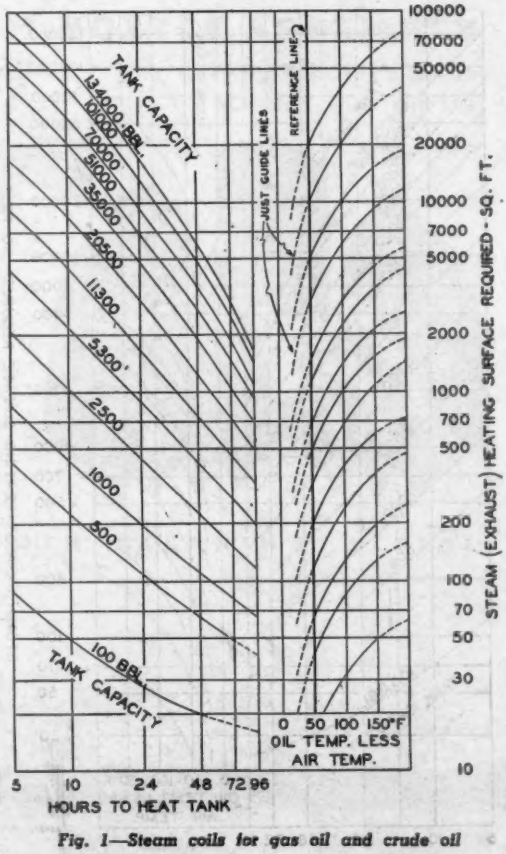

Fig. 1—Steam coils for gas oil and crude oil

No. 12 in a series by W. L. Nelson, professor of petroleum refinery engineering, University of Tulsa

the coil surface. The charts are based on the use of exhaust steam. When using other steam pressures the surfaces required may be reduced by the following approximate factors or multipliers:

Pressure (lb. ga.)	Temp. (° F.)	Factor
Exhaust	212	1.0
21	260	2/3 (.67)
63	310	1/2 (.5)
138	360	1/3 (.33)

Steam Required

The amount of steam required per barrel of oil is almost independent of the shape or size of tank (except for very small vessels). It is affected by the time of heating, temperature of oil with respect to air (particularly after tank is already hot), and the steam pressure. For exhaust steam (212° F.) the steam required is as follows:

Time of heating—	Lb. steam per bbl. per ave. degree diff. in temp. of oil and air
1 hour	137-140
5 hours	28-32
10 hours	14-18
Long* (50° diff.)	6-8
(100° diff.)	5-7
(150° diff.)	6-8

*Also applies to tank already hot.

Somewhat smaller amounts of high-pressure steam are required if the steam is not allowed to blow through the coil, but the difference in steam requirements is very small and may be neglected.

Example 1.—A 250-bbl. tank of Bunker C fuel oil is to be heated in 7 hours. The air and tank are at 50° F., and it is necessary to hold it at 120° F. Thus the difference in temperature between air and oil will be 70° F. Dotted lines are shown on Fig. 3. Move upward on 7-hour line to 250 bbl. capacity and follow horizontally to right to 50° F. temperature-difference line. Follow a path between the guide lines at the right to a temperature difference of 70° F. and then horizontally to the right, finding a surface of 520 sq. ft. If 120-lb. steam is used rather than exhaust steam, only about 40 per cent as much surface is required, or 210 sq. ft.

Example 2.—Same as Example 1, except that the tank is to be held at 80° F. which means the temperature difference between the air and the hot oil is only 30° F. Proceed as in Example 1, except when at 50° F. reference line, follow downward to 30° F. rather than upward to 70° F. The surface required is only 225 sq. ft., and only 90 sq. ft. if 120-lb. steam is used.

Example 3.—A 2,500-bbl. tank of cylinder stock must be heated to 130° F. for pumping. The air temperature is 10° F., and the tank has 2,100 sq. ft. of coil in it. Can we begin pumping in one day?

Use Fig. 2. Locate 2,100 on the sq. ft. scale on the right. Move horizontally to a temperature difference of 120 (or 130 less 10) and move downward to the left between the guide lines to the 50° F. reference line. Move horizontally to 2,500-bbl. line and read 15 hours on the bottom scale.

The steam (exhaust) required for heating will be about 14 lb. per barrel per average degree difference in air and oil temperature. Average oil temperature is about 70° F. and the air is at 10° F. During heating the total steam consumption is about 60 times 14 times 2,500, or 2,100,000 lb. Less than half as much steam is required to maintain the tank at the high temperature.

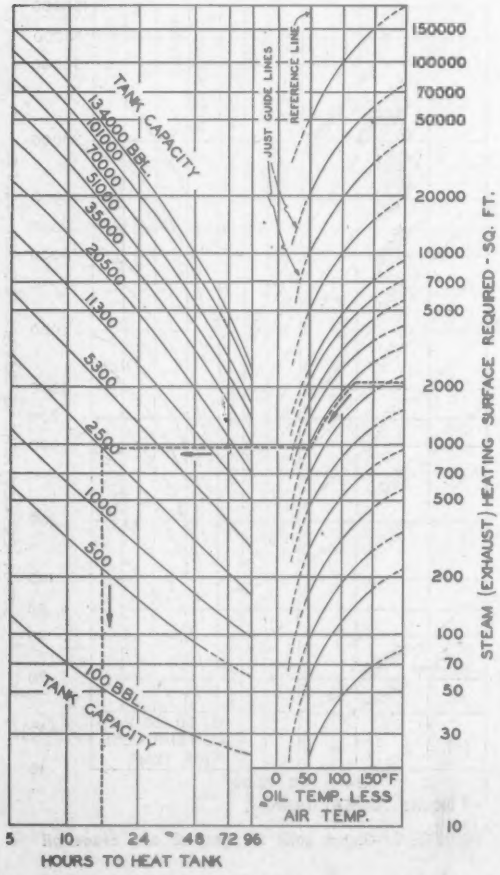

Fig. 2—Lubricating oils—steam coils for tanks

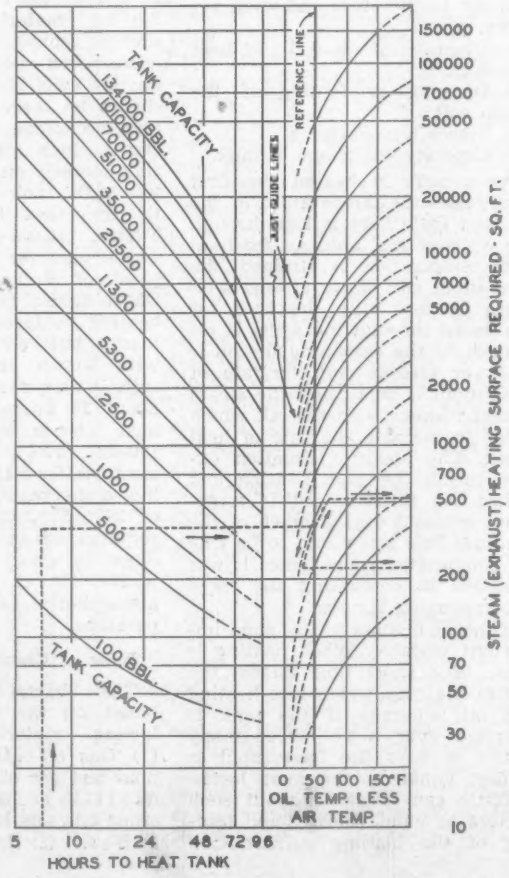

Fig. 3—Semisolid oils—steam coils for tanks

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9⅝"–13"	1/2", 5/8", 3/4", 7/8"	1/2", 5/8", 3/4", 7/8"

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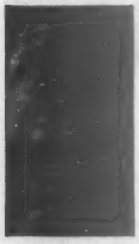

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REFINING

Jersey Company Plans Vast Laboratory Expansion

NEW YORK. — Standard Oil Co. of New Jersey is considering a far-reaching expansion plan for laboratories at its various refineries, it is understood. While details have not yet been completed, the program may call for an expenditure over a number of years of between $20,000,000 and $30,000,000.

It had been intended to officially announce specific plans at the celebration on September 30 of the twenty-fifth anniversary of the founding of the Standard Oil Development Co., research subsidiary of the Jersey company, but details could not be worked out in time.

One tentative phase of the expansion, it is reported, calls for possible construction of a new laboratory at Bayway, N. J., to partly replace present buildings. This laboratory probably would be the largest and most complete ever built by the oil industry and in some quarters total cost of the building and equipment has been tentatively placed at something like $15,000,000 alone.

Hurricane Sends Tankers To Docks for Repairs

WASHINGTON.—The recent hurricane along the Atlantic Coast is reported to have laid up several oil tankers for repairs, with the result that some of the business planned for tankers will have to be switched to tank cars. This will interfere in some degree with the supply of tank cars which was expected to be available for service to and within the Middle West region.

Recommendation on Valves Approved by Industry

WASHINGTON.—National Bureau of Standards, through its Division of Simplified Practice, has announced that the proposed simplified-practice recommendation for iron and

Sketches of Plant Operators

S. R. BOLLES, new superintendent of the Latonia, Ky., refinery of Sohio Petroleum Co., got his first refinery experience as a fireman on the crude stills of Standard Oil Co. of New Jersey's Bayway, N. J., plant. Born in New York City in 1897, he had attended Stevens Institute of Technology when World War I came along, and he enlisted in the U. S. Marine Corps for the duration. On being mustered out he sought a job and landed the one at the Bayway plant.

Several years on pressure stills and the early development of tube and tank cracking units provided a practical apprenticeship in manufacturing, and young Bolles was transferred to the technical service department as field man in development of the cracking-coil process. He traveled throughout the United States and Canada for several years as cracking-coil process inspector.

In 1929 Bolles was transferred to The Standard Oil Co. of Ohio as cracking-coil foreman at the Toledo refinery. Three years later he was assigned to industrial engineering for the company. In 1937 he was made assistant superintendent of Sohio's Latonia plant, which post he filled until his recent promotion to superintendent.

S. R. BOLLES

steel relief valves for petroleum, chemical and general industrial services, has been approved for promulgation. Effective date is October 1, and the recommendation is identified as R205-44. The valves covered are intended primarily for air, gas, vapor and liquid service requirements for oil refineries, gasoline plants, synthetic rubber projects and chemical plants.

Until printed copies are available, a limited number of mimeographed copies of the recommendation may be obtained from the Division of Simplified Practice, National Bureau of Standards, Washington 25, D. C.

Gulf Coast Gasoline Stocks Continue Rising Trend

HOUSTON. — Gasoline stocks at the 11 active plants of Gulf Coast Refiners Association continued their moderate upward movement during the first half of September. At midmonth they totaled 1,378,318 bbl., 93,918 bbl. higher than the figure at the close of August. A year ago the total was 1,830,355 bbl.; 2 years ago, 2,830,193, more than double the current inventory.

Automotive gasoline stocks considered alone were 386,829 bbl. on September 15, a decrease since August 31 of 38,897 bbl. and the lowest reported during the past 5 years. This is about 44 per cent of the 862,617 bbl. of automotive gasoline in storage a year ago, but only 22 per cent of the 1,731,395 bbl. reported September 15, 1942, when such a volume was considered about normal.

Kerosene stocks were 230,249 bbl. September 15, an increase of 17,850 bbl. in the 2 weeks. Diesel gas-oil stocks were 82,537 bbl., a decrease of 92,902. Stocks of other grades of gas oil increased 98,734 bbl. to 1,023,662. Two years ago these refineries carried 1,508,914 bbl. of burning oils and 820,145 of diesel gas oil. No. 5 fuel oil decreased 77,484 bbl. to 258,082, and Bunker C fuel-oil stocks rose 114,241 bbl. to 496,524. Cut-back asphalt stocks were 12,495.

Total stocks of all products were reported at 3,604,990 bbl. September 15, an increase of 157,923 bbl. during the first half of the month. A year ago total products stocks were 3,644,036 bbl. Two years ago they were 6,440,886 bbl.

Crude-oil throughput averaged 119,417 bbl. a day, maintaining recent high levels. Crude runs were at 85 per cent of rated capacity, an increase of 23,987 bbl. daily in comparison with operations at 78 per cent of capacity a year ago when the group processed 95,430 bbl. a day. Two years ago crude runs were 105,500 bbl. daily.

Operation of Abasand Plant To Begin in Few Weeks

EDMONTON, Alta. — A complete new refinery of Abasand Oils, Ltd., will be in operation within a few weeks at Fort McMurray, 280 miles northeast of Edmonton, according to G. R. Cottrelle, Dominion oil controller, who has returned from an inspection trip to the plant. "It has not yet been demonstrated whether the oil can be economically extracted from the sands," he stated. "Neither is it known what specific products can be made, or at what cost. Until this is done, and until a large deposit is located, there is no foundation for a commercial operation."

Humble Injunction Against Government Suspended

HOUSTON.—The preliminary injunction granted to Humble Oil & Refining Co., restraining the federal Government from threatened seizure of the plaintiff's Ingleside, Tex., refinery in a labor controversy, was stayed by an order issued on application of the Government by the U. S. Circuit Court of Appeals, in New Orleans. A motion by Humble to vacate the stay order was scheduled for hearing before the appeals court in Atlanta October 3.

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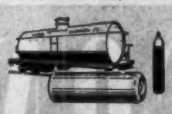

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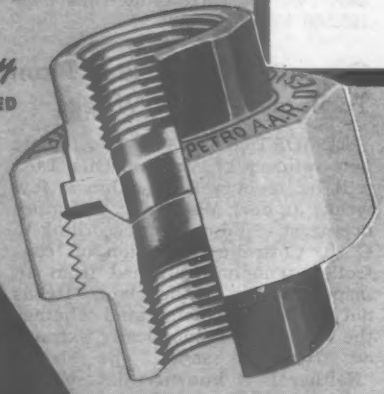

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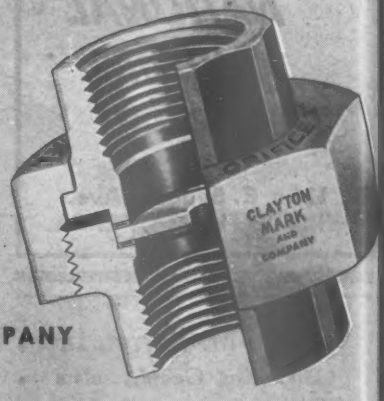

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Natural Gas

OPA Eases Regulation on Contract Renegotiation

WASHINGTON. — Office of Price Administration issued a directive last week under the provisions of which producers of dry gas may renegotiate contracts in cases where a substantial part of the total volume of sales during April 1942 already have been renegotiated. The predetermined price schedule under which the other contracts were renegotiated must be followed. In no cases can the new contract price exceed the prevailing price for dry gas in the same marketing area. Industrial consumers purchase this gas from producers, and they will absorb any increases made over existing contract levels. Since May 1942 renegotiated contracts could not have prices above the old contract levels. When prices were frozen in that month by OPA, some producers were in the process of renegotiating contracts in accordance with a predetermined uniform-price schedule.

Honoria B. Moomaw Resigns From A.G.A.

NEW YORK.—Honoria B. Moomaw has resigned as secretary of the Natural Gas Department of American Gas Association to take a position in the natural-gas consulting organization of E. Holley Poe, in New York. Before becoming secretary of the Natural Gas Department in 1942, Miss Moomaw for several years was secretary to Poe when he was with American Gas Association as executive secretary of its natural-gas activities.

Plan Rejuvenation of Oil Pool by Reinjecting Gas

EL DORADO. — Rejuvenation of the 22-year-old Blossom-sand pool in the Stephens field of Columbia, Nevada and Ouachita counties, by reinjecting natural gas, is to be attempted, according to plans announced by Arkansas Oil and Gas Commission. The 202 wells in the pool are now producing less than 3 bbl. daily each. The sand is found at a depth of 2,150 ft.

The Ohio Oil Co., which owns and operates 125 wells in the pool, was granted a permit for the secondary recovery operations. All operators in the field were invited to observe the results and if they look promising from a physical and economic standpoint the commission will propose formation of a unit to repressure the entire field, Director Alec M. Crowell said.

Liquefied-Gas Industry Can "Weather Winter"

NEW ORLEANS.—The liquefied-gas industry "will be fully able to weather the coming winter, but cannot take on new customers due to military demands for the product," Paul K. Thompson, chief of the liquefied petroleum gas section of Petroleum Administration for War, told 200 southern gas dealers meeting here.

Thompson urged dealers to "discourage consumer overoptimism regarding the likelihood of more liquefied petroleum gas when the war in Europe is over."

"This may be the most critical winter in the history of our industry," he said, "and if we are prepared to meet the worst, then we can take what comes and best serve the needs of home front consumers and our armed forces."

Caine Appointed Chief Statistician of A.G.A.

NEW YORK. — Walter E. Caine, formerly assistant chief of the division of rates and research in Federal Power Commission, has joined the American Gas Association as chief statistician. Plans are under way to rebuild the statistical department, which has suffered loss of personnel in recent years. Besides compiling national statistics for the gas industry, Caine will be in charge of an enlarged program of statistical analysis and market research.

Olds Starts on His Second Term as Member of FPC

WASHINGTON.—Leland Olds, of New York, has taken his oath of office as a member of Federal Power Commission for a second 5-year term, expiring June 22, 1949.

In 1939 Olds became vice chairman of the national power policy committee and served also as a member of the water resources committee and energy resources committee of the National Resources Planning Board. In 1940 President Roosevelt appointed him chairman of the U. S. St. Lawrence Advisory Committee and in March 1941 he was cosigner of an agreement with Canada, providing for development of the Great Lakes-St. Lawrence basin.

Recycling

Katy Plant to Have More Fractionating Towers

HOUSTON. — Three additional fractionating towers are to be installed at the Katy Cycling Plant, unitized project conducted by a committee representing operators in the Katy field. Contract for the new equipment, said to involve $800,000, has been awarded to Hudson Engineering Corp. by Humble Oil & Refing Co., operator of the unit. The new towers will produce pure propane, isobutane and normal butane.

The second unit of the plant will be in operation in a few weeks, bringing the total capacity to 350,000,000 cu. ft. of natural gas daily.

Natural Gasoline

Natural-Gasoline Output Hits Another New High

WASHINGTON. — Another new high was attained in July in the daily average production of natural gasoline and allied products, which rose to 11,607,000 gal., compared with 11,462,000 gal. in June. The July 1943 daily output was 9,873,000 gal. The principal gains were in Texas, southern Louisiana, and California. Inventories declined both at plants and refineries, totaling 2,184,000 gal. less than on June 30, 1944, and 25,326,000 less than a year ago.

PRODUCTION
(Thousands of gallons)

	July	June
Natural gasoline	191,814	182,658
Cycle products	77,322	75,180
Liquefied petroleum gases:		
Isobutane*	16,926	15,666
Other L.P.G.*	73,752	70,350
Liquefied refinery gas	13,104	10,080
Benzol	8,400	8,400
Total production	381,318	362,334

*At natural-gasoline and cycle plants.

PIPE LINES

CRC

PIPE LINE CONSTRUCTION EQUIPMENT

CRUTCHER-ROLFS-CUMMINGS
Pipe Line Equipment and Materials
Houston, Texas, U. S. A.

Tennessee Work Pushed For Early Completion

Only 36.8 miles remained to be laid to complete the 1,265-mile system of Tennessee Gas & Transmission Co. at the beginning of this week. All of the line in Texas has been laid. Six spreads are engaged in the final work, one in Louisiana and the others in Kentucky. Pigging and blowing of 938 miles has been done with natural gas furnished from several sources along the route. With the exception of five river crossings which are 90 to 95 per cent finished, all river crossings are completed.

Except for the station in Kentucky near the Big Sandy River where certain items of equipment have not been received, all of the seven compressor stations are ready to function according to schedule. Some clean up and paint work remains to be done except at the dehydration plant which is complete in every respect. Out of 122 mainline gate valves for the system 91 have been set.

Construction of compressor stations, meter stations and dehydration plant has been handled by Stearns-Roger Manufacturing Co., in connection with which Parkill-Wade has served as consulting engineers.

Joint Meter Committee Prepares New Code

The joint A.S.M.E.-A.P.I. subcommittee on oil-industry volumeters has been working during the past year on a general metering code which will include recommendations for the installation, maintenance, and calibration of positive-displacement-type meters used throughout the oil industry. Two subcommittees were set up to prepare drafts for the installation-maintenance and the calibration sections, both of which have been drawn up, submitted to the industry for comment, and are now in the process of being redrafted. The two subcommittees will meet in St. Louis, October 17, 18, and 19, for a final discussion of the revised drafts. The final code will be submitted to the parent groups in both the A.S.M.E. and the A.P.I. late this year. Pending the approval of these groups, the code will be available for use by the industry in the early part of 1945.

The joint A.S.M.E.-A.P.I. subcommittee on oil-industry volumeters is sponsored by the A.S.M.E. Fluid Meters Research Committee, R. J. S. Pigott, chairman, and the A.P.I. Topical Committee on Pipe Line Technology, W. F. Rogers, chairman.

Neill Joins Staff Of H C. Price Co.

James P. Neill has been appointed general superintendent of H. C. Price Co. and entered on his new duties October 1 at Bartlesville, Okla., his headquarters. For the past 15 years Neill has been with Southern Natural Gas Co., Birmingham, Ala., where he was superintendent of pipe lines.

Cut & Bevel Any Pipe
With
Maximum SPEED
Minimum COST

The H & M PIPE CUTTING and BEVELING MACHINE

SPEED: Complete cut and bevel can be made on 12 inch pipe in about 2 minutes.

ECONOMY: Save approximately one-half labor and gas costs.

PORTABILITY: Can easily be carried from one pipe section to another.

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The H & M
Pipe Beveling Machine Co.
20 East 25th - - Tulsa, Oklahoma

McCORD
"CLEARSITE"
SIGHT
FEED

McCord "Clearsite" plastic sight feeds provide a new degree of visibility and clearness, supplying positive proof of oil delivery. Due to its design this sight feed may be used as an independent sight at point of lubrication. As an accessory it can be added to any lubrication system. Specify "Clearsite."

McCORD "SF" LIQUID SIGHT FEED LUBRICATORS

A highly developed lubricator, particularly adapted to cylinder and bearing lubrication. Features: Precision built, most flexible and positive oil delivery system known. Supplied in 1 to 24 feeds. Specify McCord "SF" Lubricator.

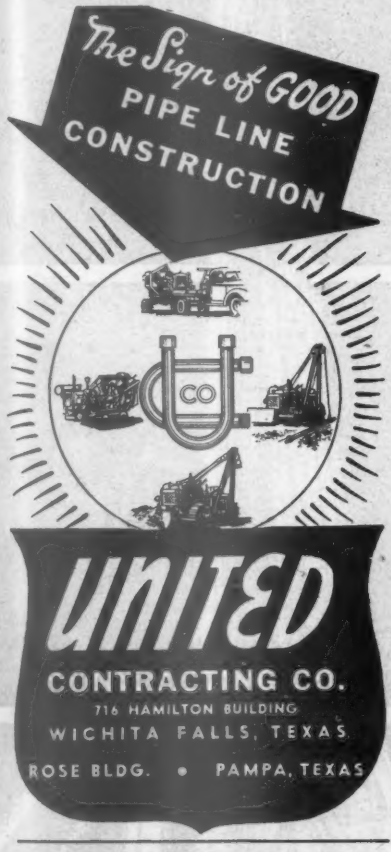
For Sale by National Supply Co.

McCORD RADIATOR & MFG. CO.
DETROIT, MICHIGAN
LUBRICATOR DIVISION

Portable Pipe Lines Operate in France

High-grade aviation fuel and diesel oil is being pumped from Cherbourg through several lines across France to serve the battle front being pushed into Germany. Pipe diameters used are 4 in. and 6 in. Pipe has been laid at an average of 10 miles per day, according to reports, with a maximum of 50 miles in 1 day.

Now that front lines are established at the German frontier, pipeline transportation of fuel is said to be regarded as considerably more significant than truck transportation for large shipments. Pipe lines relieve the highways of a heavy load and make them more available for other traffic. Products are said to be pumped direct from tankers to canning stations at convenient points from which many deliveries are made in 5-gal. cans. There are no large storage depots in connection with these operations.



Standish and Sohio Seek Permit for W. Edmond Line

An application has been filed with Petroleum Administrator for War by Phillips Petroleum Co.'s subsidiary, Standish Pipe Line Co., and by Standard Oil Co. of Ohio's subsidiary, Sohio Pipe Line Co., for permission to build an 8-in. crude-oil pipe line from West Edmond field, Oklahoma, to Oklahoma City.

Phillips Lets Contract For Panhandle Lines

Phillips Petroleum Co. has awarded a contract to Eastern Construction Co. for laying approximately 32 miles of 20-in. and 12-in. to transport gas in the Borger-Pampa area of the Texas Panhandle to serve carbon-black plants. Work will start this month as soon as pipe arrives.

Conversion of W. E. P. to Gas Doubted by Poe

Conversion of either the 24-in. crude oil or the 20-in. products pipe lines, two War Emergency Pipelines, Inc., systems, operating from Texas to the East Coast, to the transportation of natural gas is unlikely, in the opinion of E. Holley Poe, former executive vice president of the government's Petroleum Reserves Corp., and former secretary of the natural gas department of the American Gas Association.

Poe's remarks were made in answer to a question posed last week at the meeting of the Empire State Petroleum Association in New York. He said he couldn't foresee the conversion based on the status of the markets, problems of regulation, and taxes.

He said the 20-in. line might be adapted to the movement of natural gas but "in my judgment it would be difficult to convert that line with sufficient pressure to deliver a quantity of gas here." He remarked that he had no opinion on the 24-in. line but added: "I can't see the necessity for it at this time nor for the near future."

Poe said that completion of the Tennessee Gas & Transmission Co. line in October will probably alleviate the shortage of natural gas in the Appalachian area.

"In the gas industry we are faced with the uncertainties of additional regulation both from the federal and state governments. We are going to have to determine those uses to which we think natural gas should be devoted and this decision will take careful thinking, wise planning and constructive presentation of our case before those authorities who are most interested at this time in the conversion and utilization of our resources."

Columbia Gas Changes Are Not Opposed

No formal opposition was voiced at a reconvened hearing held by the Securities and Exchange Commission at Philadelphia on its tentative findings for solving the integration problems of Columbia Gas & Electric Corp.

The commission findings held that Columbia may retain its interest in 21 companies and dispose of its interest in 18, including the electric properties in Cincinnati and Dayton, and Covington, Kentucky. The commission reserved for future consideration the interest held by Columbia in 11 other companies.

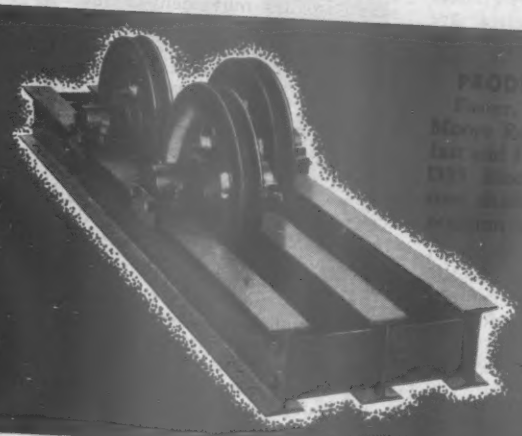
I. C. LITTLE

1608 MERCANTILE BANK BLDG.
DALLAS, TEXAS
Central Warehouse: Valley Park, Missouri

CONTRACTOR

The I. C. Little organization have constructed many hundreds of miles of oil and natural gas connecting lines during the past year with a *thoroughness* that stamps every I. C. Little job as tops. If I. C. Little does it it must be *thorough*.

Moore Production



TRUCK MOUNTED MAST

A complete unit with truck bed frame, rod hanger, rod platform, tubing platform, leveling indicator and three quick acting ratchet type screw jacks. Hangs rods in doubles. Racks tubing in range two singles or range one doubles. Tubing Platform capacity adjustable to maximum of 4,200′ of 2½″ tubing.

Mast is automatically raised or lowered in less than one minute, by power from hoist through a mechanically controlled friction clutch. Height of mast from ground level to center of crown sheaves is 63′-0″.

Exploration and Drilling

Week's Highlights

MISSISSIPPI has another new field in Gulf Refining Co. 1 C. V. Cooper, located in the Baxterville area, 7-1n-16w, Lamar County, with one drill-stem test showing a high-pressure gas horizon, and two other sections showing oil. The Moody's Branch was logged at 2,261 ft., Midway at 5,648 ft., Clayton 6,432 ft., Selma 6,450 ft., and top of the Eutaw at 7,423 ft.

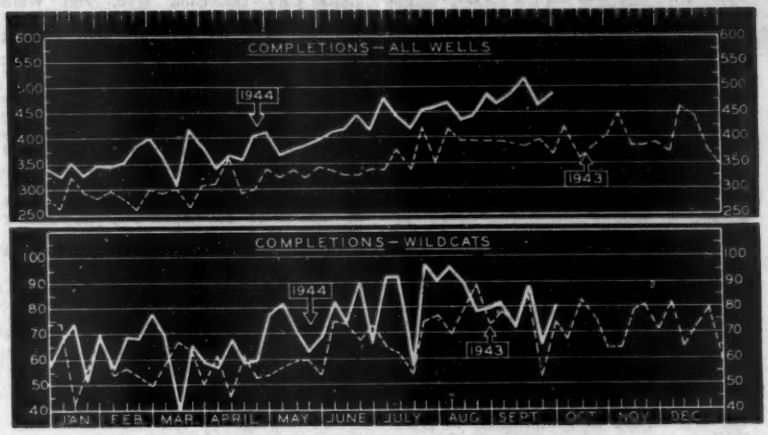
Coring commenced at 7,648 ft. A porous sand at 7,736-46 ft. had an odor of gas, and coring was continued to 7,786 ft. In a drill-stem test covering 7,736-86 ft, the 500-ft. water cushion started to unload 5 minutes after opening valve. In 6 minutes surface pressure was 800 p.s.i. and the tool was closed. Two chokes, a 3/8-in. bottom and 1/4-in. top, were used. Recovery was 180 ft. of original water load and 360 ft. of gas-cut mud. The recorded bottom-hole flowing pressure of 3,750 p.s.i. In coring ahead, base of sand was placed at 7,798 ft. with 7,798-7,816 ft. reported as shale and thin sand streaks.

A second drill-stem test at 7,786-7,816 ft., employing combination packer, the same two choke sizes and 650 ft. of water load, open for only 13 minutes, yielded top-hole pressure of 1,950 p.s.i. Recovery was 180 ft. of 45° gravity oil and 90 ft. of oil-cut mud.

After coring in the interval 7,816-64 ft., a drill-stem test, with packer at 7,832 ft. and tool open 30 minutes, was reported to have recovered 600 ft. of free oil, 90 ft. of oil-cut mud, and 600 ft. of the water cushion.

The 1 Cooper is only 6 miles northeast of the Louisiana corner, and nearest oil production is in the Mallalieu field of Lincoln County. Here California Co. recently completed 1 Douglas, NE SE 10-6n-8e, for production in the Massive sand of the Tuscaloosa section. The sand section is between 10,522 and 10,560 ft. Gulf's findings in the Eutaw horizon will be temporarily passed by to drill ahead and explore the Massive.

Five new wildcats started in Mississippi this week, one each in Clark, Copiah, Itawamba and Simpson counties, and Sinclair-Wyoming Oil Co. 3 Newman Lumber Co., NE SW 5-5n-16w, Lamar County, 25 miles north of the Gulf Cooper.



Solid line charts current weekly completions

COMPLETIONS IN ALL FIELDS . . .

Week ended September 30, 1944

	Oil	Gas	Dry	Total	Footage	Total Comp. to date 1944	1943
N. Y., Penna., W. Va.*	58	24	5	87	136,151	2,560	2,574
Ohio	2	7	11	20	58,640	739	677
Indiana	4	0	4	8	17,557	186	171
Kentucky	9	1	1	11	19,713	542	317
Illinois	28	0	14	42	103,853	1,385	1,307
Michigan	10	2	10	22	50,659	480	447
Kansas	20	2	17	39	132,397	1,347	1,235
Nebraska, Missouri, Iowa	2	0	0	2	3,888	30	36
Oklahoma	26	2	18	46	171,616	1,331	906
Texas:							
North Central	13	1	19	33	89,773	1,100	1,092
West	22	0	4	26	130,935	1,144	653
Panhandle	7	2	0	9	27,662	193	133
Eastern	2	0	3	5	26,048	240	216
Gulf Coast	18	4	10	32	229,593	929	340
Southwest	5	3	4	12	45,364	522	684
Total Texas	67	10	40	117	549,375	4,128	3,118
Louisiana:							
Northern	2	3	2	7	21,973	237	232
Southern	4	1	4	9	88,417	360	269
Total Louisiana	6	4	6	16	110,390	597	501
Arkansas	5	0	3	8	39,183	166	182
Mississippi	3	0	2	5	25,413	108	64
Southeastern States	0	0	1	1	5,320	36	†
Montana	2	0	4	6	15,598	286	166
Wyoming	2	1	1	4	15,232	128	104
Colorado-Utah	1	0	0	1	6,236	28	18
New Mexico	5	0	3	8	30,195	290	167
California	38	3	4	45	167,638	1,484	982
Total United States	288	56	144	488	1,659,054	15,831	12,972
Total previous week	280	55	127	462			
Total October 2, 1943	194	39	132	365			

*Does not include 53 service wells. †Included in total shown for Mississippi.

SOUTHWEST TEXAS

Gas-Condensate Field Opened in Lavaca

CORPUS CHRISTI.—A new gas-condensate field was opened in Lavaca County by Sterling Oil & Refining Co. 1 Mary Hoffman et al, 12 miles southeast of Yoakum. This well was drilled to total depth of 9,003 ft., 5½-in. casing was set at 7,828 ft., pipe perforated with 144 shots from 7,716-50 ft., and the well flowed 2,486,000 cu. ft. gas with 50 bbl. condensate daily through 3/16-in. choke, tubing pressure 2,400 lb. casing pressure 2,200 lb.

Magnolia Petroleum Co. 1 W. E. Erp, wildcat 9 miles west of Pettus, Bee County, ran drill-stem test at 6,780-83 ft., no pressure reported, but showed strong blow of gas and recovered 90 ft. of slightly oil-and-gas-cut mud. It is now coring ahead.

L. M. Lockhart 1 Carrie Cheeves, wildcat 2 miles north of Banquette, in Nueces County, showed gas with condensate in perforations 5,168-82 ft. Drill-stem test, using ¼-in. choke at the 5,168-ft. level, had built up 1,150 lb. working pressure, showing gas condensate, but recovery was six joints of fresh water. Previous tests, at 4,830-42 ft. and 5,090-5,110 ft. had shown salt water. Total depth is 7,097 ft., with 5½-in. casing set at 5,481 ft. Operators are now testing in perforations at 5,450-62 ft.

Humble Oil & Refining Co. is testing at 1 A. M. Lockwood, extension test in the Charlotte area of Atascosa County, but details are not yet available. Total depth is 6,919 ft., and 5½-in. casing was set on bottom and perforated at 6,892-97 ft. for the test. Drill-stem tests, before setting casing, at 6,899 and 6,919 ft. had shown oil recovery.

Standard Oil Co. of Texas 4 Braulia G. de Garcia, in East Alta Mesa area, Brooks County, ran drill-stem test in open hole from 8,074-8,106 ft., ¼-in. choke top and bottom, showed 3,100 lb. pressure, sprayed condensate. Total depth is 8,106 ft. with 5½-in. casing set at 8,074 ft. Test is now being made in 56 perforations at 7,287-74 ft., packer set at 7,372 ft. Using ¼-in-chokes top and bottom it showed 1,250 lb. working pressure in 50 minutes, and in 2 hours and 10 minutes started flowing salt water, pressure dropping to 400 lb. It stopped flowing at the end of the next hour.

Tide Water Associated Oil Co. 1 G. A. Gerdes has opened oil production in the West Sinton area of San Patricio County, about half a mile northwest of Sinton townsite.

H. H. Howell 3 Nina Adams, North Magnolia City extension area, Jim Wells County, flowed at rate of 80 bbl. of pipeline oil daily on 3/16-in. choke, tubing pressure 900 lb., total depth is 5,464 ft., 5½-in. casing set on bottom, perforated in sand topped at 5,404 ft.

H. R. Smith and W. C. McBride, Inc. 1 McCaskill, Jr., wildcat in Porter area, Karnes County, had sand showing gas from 7,407-19 ft. and sand showing oil from 7,419-35 ft. Drill-stem test at 7,408-14 ft. recovered gas-cut mud, 46 lb. working pressure, 14 minutes; drill-stem test at 7,421-28 ft. developed 105 lb. working pressure in 6 minutes, recovered 160 ft. gas-cut mud, rainbow show of oil, seat failed. Total depth is 7,435 ft. Now running test at 7,425-35 ft.

The Oil Field Nomenclature Committee of the South Texas Geological Society has given the name Albrecht to the field discovered by Continental Oil Co. 1 V. Albrecht, in Goliad County.

SOUTHWEST TEXAS WILDCAT COMPLETIONS

Caldwell County: Magnolia Petroleum Co. 3 Strawn, James S. Montgomery Sur., 3 miles north of Lytton Springs, dry at 1,425 ft.

Duval County: R. Thomas McDermott 1 Seferino Herrera, 12 miles east of Bruni, Sur. 167 (or 146), dry at 3,216 ft.

Goliad County: Continental Oil Co. 1 Victoria Albrecht et al, Albrecht field discovery, 3⅝ miles south of Cabeza Creek-Wilcox discovery, in Manuel Carriona Sur., total depth 10,958 ft., perforated with 48 holes at 8,340-60 ft., potential test 45 bbl. 14 hours, ¼-in. choke, gas-oil ratio 79,011:1, tubing pressure 2,475 lb., casing pressure 125 lb., gravity 58.8, no water.

Guadalupe County: Wiegand Bros. 2 Paul and Emma Baumert, M. Besore Sur., 2 miles south of Kingsbury, dry at 2,617 ft.

Karnes County: Anderson Prichard Oil Co. 1-W Mrs. Edmonia Tenberg, Burnell area, Jas. Johnson Sur. 164, total depth 6,953 ft., perforated with 264 holes from 6,735-68 ft., potential test 3,995,000 cu. ft. gas daily through ¼-in. choke, 70 bbl. condensate a day, tubing pressure 2,450 lb., shut-in tubing pressure 2,525 lb., no water.

Refugio County: Hewit & Dougherty 1-B Mrs. Jamie Hynes, 21 miles north of Refugio, in Power & Hewitson Sur., dry at 6,515 ft.

Willacy County: Sinclair Prairie Oil Co. 1 F. L. Burns, Sur. 51, dry at 9,015 ft.

Zavala County: Humble Oil & Refining Co. 1 Ike T. Pryor, Pedro Jose Aguierre grant, dry at 5,867 ft.

DAILY AVERAGE PRODUCTION FOR WEEK

	Sept. 30 crude oil	Distillate, allied products	October P.A.W. quota all oils	Sept. 23 crude oil
Arkansas	80,700	4,500	83,000	81,050
California	882,500	51,100	937,300	881,250
Colorado	8,950	.....	8,500	8,750
Eastern	68,800	6,100	80,200	70,000
Illinois	210,300	11,500	217,100	194,700
Indiana	13,600	.....	13,500	12,700
Kansas	277,500	4,300	280,000	280,900
Kentucky	28,600	2,500	27,800	24,600
Louisiana	361,350	35,000	385,000	362,600
North Louisiana	73,000	.....	.....	74,250
South Louisiana	288,350	.....	.....	288,350
Michigan	49,300	400	50,500	49,990
Mississippi	48,850	.....	46,000	49,150
Montana	23,950	200	22,300	20,810
Nebraska	900	.....	1,000	900
New Mexico	106,250	5,500	115,500	106,050
Oklahoma	343,400	27,000	366,800	342,850
Texas	2,156,150	138,000	2,278,000	2,156,150
East Texas	370,900	.....	.....	370,900
East Central Texas	149,800	.....	.....	149,800
North Central Texas	147,850	.....	.....	147,850
Texas Panhandle	98,750	.....	.....	98,750
West Texas	504,200	.....	.....	504,200
South Central (S. A.)	19,300	.....	.....	19,300
South Texas (Laredo)	79,000	.....	.....	79,000
Lower Gulf Coast	243,300	.....	.....	243,300
Upper Gulf Coast	543,050	.....	.....	543,050
Wyoming	97,100	3,000	98,300	95,060
Total United States	4,758,200	289,100	5,010,800	4,737,510
Change from previous week	up 20,690	.....	.....	.....

Total production January 1-September 30, 1944 ..... 1,238,537,820 bbl.
Same period last year ..... 1,097,679,390 bbl.

ILLINOIS

Phillips Has 2 Good Wells On Near Completion List

MATTOON.—The most important new wells of the week in Illinois were not yet on the completed list when this was written. They were drilled by Phillips Petroleum Co. The first was Phillips 5 W. R. Tuley, SW NE NE 21-6s-10e, which extended the Concord pool in White County one location north. It flowed 925 bbl. in 24 hours, following acid treatment in McClosky lime. The other was Phillips 1 Richland, NE SE SE 6-2n-10e, 3 miles from other production in Richland County. It flowed naturally at the rate of 528 bbl. per day from McClosky lime at 3,150-59 ft., total depth. It produced nearly 1,300 bbl. of oil in 40 hours after the plug was drilled.

The largest completion of the week was Pure Oil Co. 1 M. M. Grubb, NE NE NE 2-2n-8e, Clay City field, Clay County. It was good for 619 bbl. the first 24 hours after an acid treatment in McClosky lime at 3,045-47 ft., total depth 3,055 ft.

Forty-two wells were completed during the week, 28 oil wells and 14 dry holes. One wildcat, George & Wrather 1 M. Smith, W½ NW SE 25-5n-13w, Lawrence County, pumped 30 bbl. of oil and 17 bbl. of water in 24 hours from Benoist sand at 1,623-44 ft.

Fifty-nine new operations were started in the state including these wildcats: Ed Geick and Aetna 1 J. Price, SE SE SW 31-3n-12w, Lawrence County; Amsco 1 M. G. Austin, NE NE SW 28-6s-9e, White County; T. O. Wall 1 Broster-Miller, NW SE NW 19-3s-11e, White County; Deep Rock Oil Co. 1 Interstate Coal, SE SW NW 4-4s-1e, Jefferson County; Sam J. Burkett 1 Roy Pinnell, SW NW NE 12-12n-14w, Edgar County; Fogle et al 1 Young, NE SE SE 1-9n-10e, Cumberland County; Pure Oil 1 C. Kaufman, NE SE SE 27-6n-10e, Jasper County; L. Aich 1 J. O. Gonterman, NE NW NW 21-4n-6w, Madison County, and Sinclair-Wyoming Oil 1 B. B. Baer, SW NW NW 23-2n-6w, St. Clair County.

The Texas Co. is drilling the first deep test in the Dale-Hoodville field in Hamilton County, where McClosky lime is found at about 3,000 ft. The test is No. 14 Matilda Davis, C NW NE 7-6s-7e. Devonian lime is believed to lie at about 4,500 ft. in that area and it is the objective of the test.

ILLINOIS WILDCAT COMPLETIONS

Clark County: J. E. Carlson 1 Gehl, SE NE SW 32-11n-14w, dry at 552 ft.

L. D. Kling, 3 Blakeman, SW SW SW 7-9n-13w, dry at 628 ft.

FOR SALE
DRILLING EQUIPMENT FOR DEEP DRILLING
JUST PURCHASED

3—125 H. P. 350 W.P. F & T Boilers—completely reconditioned.
3—108 H.P. 350 W.P. Lucey Boilers—completely reconditioned. Certificates attached—
1—13⅝" Cameron SDA blowout preventer 3000# test with 13⅜" master valve, all accessories & 4½" & 5½" rams.
6—300 Ton Emsco swivels, reworked, late type.
1—300 Ton Ideal swivel, reworked, late type.
2—Oil Well 12 x 12 vertical steam engines.
1—Oil Well 12 x 12 horizontal steam engine, piston type, complete.
2—Ideal 12 x 12 steam drilling engine, piston type, complete.
2—15½ x 7¾ x 20 Gardner-Denver steam slush pumps.
2—14 x 7¾ x 18 Wilson-Snyder steam slush pumps, side suction type.
2—14 x 7¾ x 18 Wilson-Snyder steam slush pumps with Abercrombie steel ends.
1—8½" Lucey Drawworks, jackshaft, completely roller bearing with Hydraulic brake—complete and in excellent condition.
1—7½" Oil Well, jackshaft, completely roller bearing, drawworks—completely overhauled.
1—Wilson Titan Drawworks with 350 H.P. Wilson motor & gear box—completely overhauled—36" Hydraulic brake.
1—4½ x 10 Gardner-Denver power pump—late model, enclosed, high pressure fluid end, completely overhauled.
1—6 x 12 Gardner-Denver power pump—same as above.
2—7¼ x 14 Gardner-Denver power pumps, XEK model, roller bearing, enclosed, excellent condition.
1—27½" Oil Well Oilbath rotary, unitized with 7 x 7 Oil Well vertical engine, unitized into direct drive, on steel skids, excellent condition.

DRILL PIPE

6000' 4½" Flashweld, Range II drill pipe, bottlenecked.
5500' 3½" Hughes streamlined, full hole, Range II.
4000' 3½" Hughes regular, Range II, excellent condition.
6000' 2⅞" A.P.I. Reg. Range I, excellent condition.

ROTARIES

2—Hacker, water well, rotaries, all steel, complete with kellys.
2—17" Oil Well junior rotaries, make and break.
1—17" Lucey, rotary, make and break, roller bearing "bobtail."

PIPE

60,000' 6⅝" T. & C., 20, 24 & 26-lb., Range I, excellent condition.
20,000' 4½" T & C., 11-lb., Range I, excellent condition.
25,000 5" O.D., 17-lb., Range I line pipe, excellent condition.

ALICE PIPE & SUPPLY CO.

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We ship anywhere

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In every oil well where No-Co-Ro daily rolls up impressive records for efficiency and economy, producers are enthusiastic over their selection of No-Co-Ro Balls & Seats or Drops & Seats. Their selection of No-Co-Ro is based on hard-headed materialism.

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Three generations in business, past prestige, soundness, quality of products... all these have always counted in estimating the worth of Norris Brothers' products. They still apply and will continue to apply with equal force in the judging of oil well supplies.

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ROBINSON · ILLINOIS

. . . for FASTER, MORE ACCURATE, ECONOMICAL and TROUBLE-FREE ROLLING of JOINTS

AIRETOOL TUBE EXPANDERS

If you are experiencing difficulties with your tube rolling problems—it's time to switch to Airetool. Airetool Tube Expanders are giving faithful service in hundreds of refineries here and abroad.

Airetool Tube Expanders are carefully designed, precision built and thoroughly tested. Made in a variety of styles and sizes for tubes from ½" to 12" I.D.; universal or right angle drives; ironing out attachment when desired.

TUBE CLEANERS

Airetool Tube Cleaners are time savers, labor savers and most important—*tube savers.* They are engineered to prevent tracking. All types of cutter, drill and brush heads available. The motor may be loaded down to run 50 r.p.m. without stalling; is so powerful that it starts under extra heavy load. Airetool Tube Cleaners are made for straight or bent tubes in sizes from ½" to 24" I.D. Write for catalog.

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SPRINGFIELD, OHIO

AIRETOOL

Clay County: Skelly Oil 1 R. W. Johnson, SW SW NE 29-4n-7e, dry at 3,110 ft., lower Kincaid 2,040 ft., Cypress 2,675 ft., Benoist 2,839 ft., Aux Vases 2,909 ft., McClosky 3,052 ft., St. Louis 3,105 ft.

Crawford County: Sohio 1 E. Townsend, SW SW NW 7-5n-13w, dry at 2,634 ft., Glen Dean 2,056 ft., Cypress 2,289 ft., Benoist 2,423 ft., Aux Vases 2,498 ft., Ste. Genevieve 2,511 ft., Fredonia 2,530 ft.

Lawrence County: Ed Geick and Aetna 1 King heirs, NW SE SW 5-2n-12w, dry at 2,282 ft., Glen Dean 1,730 ft., Barlow 1,920 ft., Benoist 2,026 ft., Ste. Genevieve 2,217 ft.

George & Wrather 1 M. Smith, W½ NW SE 25-5n-13w, pumped 30 bbl. the first day and 17 bbl. the third day from Benoist sand tax 1,623-44 ft., TD 1,647 ft.

CALIFORNIA

Control Work Speeded On Signal's Wild Well

LOS ANGELES. — The wild well of Signal Oil & Gas Co. at the west end of the Elwood field in Santa Barbara County was still blowing at last reports. The tunnel that was started from the face of the cliff to intercept the casing and permit introduction of heavy mud and other weight material has encountered some very hard rock and it is questionable whether the tunnel can be completed in time for use. Control work from the surface will be attempted by dropping a flue over the well casing to divert the escape of gas so that after cooling the head and extinguishing the fire a clamp may be attached.

Tide Water Associated Oil Co. apparently has a gas well in 34 Wackeen in the North Mountain View district, one that cuts out beans as fast as they can be installed. On a test the well flowed at a daily rate of 8,000,000 cu. ft. of gas with a slight spray of oil but is again shut in until stronger and more durable beans can be installed. Shut-in pressures are 1,720 lb. on tubing and casing.

Drilling contractors in the Elk Hills field are approaching their full stride and completions should soon average from 20 to 30 per month. Recent completions appear to be averaging around 200 bbl. per day. Drilling time is being reduced and wells are now being completed in from 18 to 20 days depending upon subsurface conditions. In wells where circulation is lost, usually around 600 ft., completion is delayed several days. Generally several days elapse before pumping equipment is installed and the well on production. Before moving to the next job the contractor usually bails the hole down and so far this is all that has been necessary as the wells usually start off pumping in good shape. The absence of lease and well tanks at Elk Hills is marked as all wells pump direct into a lead line through which the oil is gravitated down the north flank to the Navy's storage tanks, aggregating about 250,000 bbl. From this temporary gathering point the oil is subsequently pumped over to the tank farm on the south side of the hills for shipment to pipe-line companies.

At Buena Vista Hills 12 new locations were staked during the past week by North American Oil Consolidated, Standard Oil Co. of California, Honolulu Oil Corp., Ltd., Murvale Oil Co. and Tide Water Associated Oil Co. Standard extended the productive area eastward recently and has opened up additional acreage for development. Over 1,000 acres has conservatively been proved up for production but the limits to the east and southeast remain open.

In Los Angeles Basin interest centers in Buena Park where General Petroleum Corp. is testing 1 Heath which has been bottomed at 11,422 ft. Development work at the east end of the Seal Beach field is increasing and Standard's 29 San Gabriel, which showed a flow of 2,400 bbl. on a formation test, indicates a good completion. This was from the Selover zone which overlies the zone now undering development. Continental Oil Co. with several locations proved up by extension work is redrilling 23 Bixby and has derrick standing for 48 Bixby. The Hellman Estate interests which proved up production east and north of the fault have one well drilling.

CALIFORNIA WILDCAT COMPLETIONS

Ducor wildcat district, Tulare County: Tannehill and associates 1 Hunsaker, 17-23s-17e, abandoned in basement slate, no showings of importance, TD 2,330 ft.

North Edison wildcat district, Kern County: British-American and Capital Co., 53 Portals, 3-30s-29e, flowed 78 bbl., 37.9-gravity, 2 per cent cut, 100,000 cu. ft. gas, 32/64-in. bean, pressure 40/300 lb., TD 4,770 ft., perf. 4,733-66 ft., opens up new field.

McKittrick outpost well, Kern County: Richfield, 3 Olig, 12-30s-21e, abandoned as not commercially productive, bailed water and a little heavy oil, TD 1,536 ft.

Sheep Springs wildcat district, Kern County: Rothschild-Bender, 2 Sheep Springs, 17-29s-21e, flowed 275 bbl., 25.1-gravity, 30 per cent mud, cleaning up, 33/64-in. bean, pressures 25/160 lb., TD 3,487 ft., perf. 3,450-87 ft., new discovery 2 mi. SW of Belridge field.

Treatment of Mud for Deep Drilling
In Keystone Area of West Texas
by Joseph G. Gordon
NEW SIW
MUD SCREEN
IS MAKING NEWS
Engineering and Operating
JUNE 24, 1944
Reproduction of article appearing in
OIL AND GAS JOURNAL, June 24, 1944

Operators in this area are using the SIW Mud Screen to help overcome the slow and costly drilling conditions caused by the hard lime and chert formations, which in some instances wear out bits every ten feet. As reported in this article, the SIW Mud Screen is accomplishing some highly satisfactory results. The SIW Mud Screen has been designed by engineers who know what is required of a mud screen. Ask for complete details if you want better shale removal from your drilling mud.

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ROCKY MOUNTAIN

Rangeley Step-Out Well Showing High Production

DENVER.—The first well located at any considerable distance from the discovery on the Rangely structure in western Colorado to be drilled into the Weber formation of Pennsylvanian age is being completed as a good producer in Wasatch Oil Refining Co. 1 McLaughlin, NW NW NE 32-2n-102w, a joint operation with the Idaho Refining Co. It set the 7-in. at 5,544 ft., on top of the Weber, and was drilled to a total depth of 6,236 ft. On a drill-stem test it flowed 17 bbl. an hour for 14 hours through a ¼-in. choke with a back pressure of 750 lb. on the tubing and 1,250 lb. on the casing.

Garland disappointment.—General Petroleum Corp. 1 Williams, 51-56n-97w, the first test to the Tensleep on the east flank of the Garland dome, was abandoned at 4,714 ft., after finding water in the Tensleep and slight saturation in the Embar. Top of the Tensleep was at 4,680 ft., and the Embar at 4,481 ft. Location is 1 mile northeast of 1 Nauser, the nearest Tensleep test, and on the opposite side of the axis.

Testing Horse Creek discovery.—General Petroleum Corp. has gone back into its 78-31-G, SW SE SE 31-17n-68w, Horse Creek structure, Laramie County, Wyoming, a discovery in the Lakota sand in 1942, to test the Dakota and Muddy. The well made 500 bbl. per day initial with some water from the Lakota, topped at 5,451 ft. The next spring it turned mostly to water and the hole was deepened to 7,475 ft., but found nothing below the Lakota. After plugging back it shut down and a small well was drilled ½ mile to the south and a dry hole ¾ mile to the northeast. Early this month tools were moved in to further test the Lakota and then the Dakota. At the time of the discovery it attracted wide attention due to its location on the northwest rim of the big Julesburg (Denver) Basin.

Poose Creek Devonian test.—Phillips Petroleum Co. has acquired a block of 8,000 acres on the Poose Creek structure in 2n-88w, Rio Blanco County, Colorado, and is unitizing the area preliminary to drilling a deep test to the Devonian at 8,250 ft. next spring. It is all government land. The Union Oil Co. of California drilled a well in NW SE 10-2n-88w, in 1928 which was abandoned at 1,017 ft. after testing the Sundance sand. Four years later the Weber sand discovery was made at Rangely, in the same county, opening up possibilities in deeper horizons.

MONTANA WILDCAT COMPLETIONS

Teton County, Collins area: Union Oil of California 1 England, NW SW SE 11-25n-2w, TD 1,644 ft., sulfur water in Ellis-Madison contact at 1,632 ft., dry.

Yellowstone County, Mifflin dome: Carter 1 Crow-Tribal, SW NW 17-2s-29e, dry, TD 4,284 ft., top Dakota 2,230 ft., Sundance 2,852 ft., Tensleep 3,683 ft., Amsden 3,811 ft., Madison 4,001 ft.

WYOMING WILDCAT COMPLETION

Big Horn County, Garland: General Petroleum 1 Williams, NW Lot 51-56n-97w, dry, TD 4,714 ft., water in Tensleep, top at 4,680 ft., plugged back to 4,526 ft., to test Embar, top at 4,481 ft.

COLORADO WILDCAT COMPLETION

Rio Blanco County, Rangely: Wasatch Oil Refining 1 McLaughlin, NW NW NE 32-2n-102w, joint with Idaho Refining Co., TD 6,236 ft., 7-in. 5,544 ft., on DST open 14 hours flowed 17 bbl. per hour through ¼-in. choke with 750 lb. pressure on tubing and 1,250 lb. on casing, completing in Weber formation.

EASTERN TEXAS

Wildcat Operations Offer Little Encouragement

DALLAS.—East Texas wildcat operations offered little encouragement during the past week. In southern Houston County the geologically interesting test of Ivy & Moran 2 Murray topped the Woodbine sand at 7,995 ft., cored hard gray nonporous sandstone from 7,995-8,001 ft. and porous gray sand from 8,001-11 ft., then made a 30-minute drill-stem test of the section and recovered 2,565 ft. of salt water, cut with gas, in 30 minutes. It was coring ahead. The Woodbine, dipping southward out of the East Texas basin, was topped about 2,000 ft. lower than found in the Grapeland field, some 30 miles to the north. In this field, a deep test, Grapeland Oil Co. A. M. Horne, showed nothing in the lower zones in going to total depth 11,074 ft. and has plugged back to the field's regular Woodbine sand gas pay at 6,015-30 ft.

New tests started in the district last week were Homer Snowden et al 1 C. W. Gentry, a Woodbine wildcat 7½ miles northwest of Quinlan, in Shelby CSL Survey; Sun Oil Co. 3 Dailey, Navarro Crossing field, Houston County; Gulf Oil Corp. 1-A J. F. Petty, spotted 1,511 ft. west of the company's 1 Hornbuckle, a recently completed 8,200-ft. producer in the Winnsboro area, and J. K. Hughes et al J. R. Howard, projected Smackover lime test in Bowie County, J. H. Dyer Survey, 15 miles north of DeKalb.

In Cherokee County, W. H. Foster et al 1 Bowling, Lone Star area, swabbed

NOTICE OF SALE

Invitation for bids for the purchase of stock of

SPUR DISTRIBUTING COMPANY, Inc.

NASHVILLE, TENNESSEE

James E. Markham, Alien Property Custodian, invites bids for the purchase, as a whole, of 73,039 shares of common capital stock of no par value (amounting to 52½% of the issued and outstanding stock) of Spur Distributing Company, Inc., a Delaware Corporation with main office and place of business at Nashville Tennessee, and engaged in the retail distribution and sale of gasoline, lubricating oil, tires, and miscellaneous items, through over 200 owned and leased service stations located in approximately 20 states. *Copies of a Statement of Terms and Conditions relating to Bids, and a Prospectus may be obtained at the Office of the Alien Property Custodian, 120 Broadway, New York 5, New York.* Bids for the purchase of the shares will not be considered unless made in accordance with, and subject to, terms and conditions set forth in said statement.

The stock will be sold only to American citizens or organizations controlled by American citizens not on the Proclaimed List of Certain Blocked Nationals. Bids should be accompanied by an affidavit that the bidder is not purchasing on behalf of an undisclosed principal, a person not a citizen of the United States, or for resale to a non-citizen.

All bids must be presented, in duplicate, at the Office of the Alien Property Custodian, 120 Broadway, New York 5, New York, on or before 12 o'clock noon, Eastern War Time, on October 27, 1944, at which time and place all bids will be opened publicly. Bids may not be revoked until an award is made or the bids rejected by the Custodian. The Custodian reserves the right to reject all bids.

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salt water with slight show of gas, from the Pettit zone, then squeezed and re-perforated at 7,368-88 ft., opposite the Rodessa zone and at close of the week was swabbing a slight show of gas, no oil.

Phillips Petroleum Co.'s two tests in the new South Tyler area, Smith County, were both fishing, the 1 Amelia Englander bottomed at 5,837 ft. and the 1 L. A. Grelling at 4,170 ft. Both are 10,000-ft. tests.

EAST TEXAS WILDCAT COMPLETIONS

Ellis County: Lasco 1 R. S. LaSage, E. D. Harrison Sur., elev. 722 ft., Paluxy 1,325 ft., Paleozoic 2,520 ft., dry, TD 2,980 ft.

Houston County: J. O. Fox and Chas. Neal 1 J. D. Woodward, J. W. Saxon Sur., 7 mi. S Crockett, elev. 312 ft., dry, TD 2,175 ft.

Titus County: Humble 1 Anhie B. Stevens, L. G. Clapham Sur., 5½ mi. E and slightly S Mount Pleasant, elev. 393 ft., Paluxy 5,443 ft., massive anhydrite 6,900-7,090 ft., first Rodessa porosity 7,212 ft., dry, TD 8,143 ft.

MICHIGAN

Production in Bloomer Field Limited; 125 Bbl. per Well

SAGINAW.—On recommendation of the state oil advisory board, P. J. Hoffmaster, Michigan supervisor of wells, directed operators in the new Bloomer field on the Ionia, Montcalm counties border to limit withdrawals to 125 bbl. per well per day. The order, effective October 1, is designed to prevent overproduction at the start in a new field which oil men believe will be highly productive.

Another producer in that field, Wadsworth & McClure 1 Stevenson, in Section 5, North Plains Township, Ionia County, rated at 200 bbl. a day, was among the 22 completions reported in the past week. Ten of the completions were oil producers, 2 were gas wells, the other 10 dry holes, half of those being wildcat tests.

The advisory board also has asked cooperation of producers in the Reed City field to save an estimated 6,000,000 ft. ft. of gas going to waste every day. Meetings are planned in an effort to find a market. As it is, the industry is utilizing about 15,000,000 ft. per day of gas from the field in various ways.

Three of the oil wells completed last week are in Allegan County, three in Bay County, two in Isabella and one in Missaukee. Best of the 10 was Sohio Petroleum Co. 3 Cummings in Section 33 of Coldwater Township, Isabella County, with an initial flow of 320 bbl. a day natural.

The state conservation department issued a dozen more drilling permits, two each for tests in Allegan, Mecosta and Newaygo counties, one each in Saginaw, Clinton, Gratiot, Cass, Genessee and Osceola counties, bringing the total for the year to 515.

MICHIGAN WILDCAT COMPLETIONS

Alcona County, Alcona Township: A. F. Pabst, Tr., 1 Bert Sayres, SE NW SW 20-28n-9e, dry, TD 2,296 ft.

Allegan County, Fillmore Township: Lewey Michmershuizen 1 Jacob Boven, NE NW NE 7-4n-15w, dry in Traverse limestone, TD 1,559 ft.

Arenac County, Deep River Township: Swanson Consolidated Oil Co. 1 W. J. Scott et al, NW SW NW 10-19n-4e, dry in Monroe, TD 3,070 ft.

Mason County, Eden Township: Marks & Shiffman 1 Carter, SW SW SW 12-17n-16w, dry hole, TD 3,276 ft.

Osceola County, Rose Lake Township: Sun Oil Co. 1-A State-Rose Lake C S½ SE SW 35-19n-9w, dry, TD 4,118 ft.

PERMIAN BASIN

Richfield Starting 8,000-ft. Ellenburger Wildcat

MIDLAND.—Richfield Oil Corp. is starting an 8,000-ft. Ellenburger wildcat in northeastern Crockett County, about 6 miles southeast of the Todd field. It is 1 Archie Beane, in SW NW Section 13, Block UV, GC&SFRR Survey. Two other new wildcats were spotted in West Texas last week, one in Howard County by Cosden Petroleum Corp., and John I. Moore 1 Cosden fee, in NE SW Section 38, Block 32, T-1-N, T&PRR Survey, to be drilled to 5,000 ft. The location is on the property of Cosden's refinery 5 miles east of Big Spring. The other new test was Fikes and Murchison 1 Alexander, NW NW Section 18, Block K, PSL Survey, a 5,500-ft. test in Terry County, being about 6 miles southwest of the Slaughter field.

Andrews County.—Two deep wildcats logged additional oil shows promising commercial production. Champlin Refining Co. 1-B University, Section 5, Block 11, northwest of Embar field, ran electric log and was setting casing at total depth 8,535 ft., with a good show of oil found at 8,450-90 ft., in addition to numerous shows higher up. It is believed in Silurian lime at present depth. Stanolind Oil & Gas Co. 1-D University, wildcat 1¼ miles south of Champlin's well, and in Section 8, Block 11, made a 60-minute drill-stem test at 8,244-51 ft., showed gas in 25 minutes, recovered 540 ft. of gas-cut mud and 1,080 ft. of free oil and oil-cut mud. It is drilling ahead to the Ellenburger, with this latest showing believed in the Devonian. British American Oil Production Co. 1 McCrae, southwest extension to the Fullerton field, after acidizing tested from 50 to 70 bbl. per hour to assure an important extension to this big field.

Borden County.—Northern Ordnance Corp. 1 Clayton and Johnson, Section 32, Block 31, T-4-N, topped Ellenburger at 9,450 ft., cored and drilled to total depth 9,498 ft., with no shows, and was attempting to make a drill-stem test.

Ward County.—Lion Oil Refining Co. 1-B University, wildcat 3 miles west of Pyote, topped Delaware lime at 4,940 ft. and stopped to run 5½-in. casing before drilling in to the sand zone, from which production might be found and which should come in within the next 30 or 40 ft.

Winkler County.—Stanolind-Shell 1-C Wheeler, ½-mile northwest outpost to the 10,000-ft. Wheeler-Ellen pool, on a drill-stem test while bottomed at 9,346 ft. in the Silurian lime recovered 180 ft. of gas-cut water blanket, 1,000 ft. of oil-cut water blanket, then flowed 8 stands of oil and gas-cut water blanket, recovering 540 ft. of heavily oil-cut mud. It cored ahead below 9,400 ft. It is the first well in this field to indicate possible production from the Silurian zone.

WEST TEXAS WILDCAT COMPLETIONS

Dawson County: Seaboard 1 Frank M. Weaver, League 2, Taylor CSL Sur., 9 mi. W Lamesa, elev. 3,029 ft., San Andres 4,660 ft., dry, TD 5,113 ft.

Hockley County: Stanolind 1-B Tom Cobb, Labor 15, Lge. 718, State Capitol Sur., 3,557 ft., top pay 4,618 ft., 95 bbl. day, gravity 30°, TD 4,673 ft.

SOUTHEASTERN NEW MEXICO

HOBBS.—A new Ordovician discovery in extreme southeastern Lea County by Humble Oil & Refining Co. 1 Federal-Leonard Oil Co., in SE SW 12-26-37, ranks in importance with previous major developments in the West Texas-New Mexico sector of the Permian Basin. With top of Ellenburger tentatively picked at 11,816 ft., elevation 3,012 ft., hole was cored to total depth 11,891 ft., and a 30-minute drill-stem test was then taken from 11,870-91 ft., using 4,100 ft. water cushion. It started flowing water cushion after 34 minutes, was making oil after 4 more minutes, was allowed to flow oil into pits for 1 minute, then testing tool was closed. It was estimated making 15,000,000 cu. ft. of gas per day, with 15 to 20 bbl. of 47.7°-gravity oil per hour, flowing pressure 3,800 lb., bottom-hole pressure 5,000 lb. in 60 minutes. When drill pipe was pulled it recovered 780 ft. of free oil. Operators were reported planning to drill deeper before running casing to complete. Geologists meanwhile were trying to put together the jig-saw pieces of the Ordovician puzzle in the area, for this new discovery on top of the Ellenburger is approximately 3,000 ft. lower than a deep failure 6 miles to the north, 2,500 to 2,700 ft. lower than the Keystone Ellenburger field some 10 miles to the southeast, and also is about 1,300 ft. lower than Magnolia Petroleum Co. 2 State-Walton, an Ellenburger producer 7½ miles south.

Atlantic Refining Co. 1 State is a new wildcat location in NE NE 33-14-33, between the Maljamar and Caprock fields, northwestern Lea County. Stanolind Oil & Gas Co. spudded its 1-M State, wildcat 8 miles west of Monument field, in NE SW Sec. 29-19-35.

SOUTHEASTERN NEW MEXICO WILDCAT COMPLETIONS

Eddy County: Texas 2 S. M. Compton, 17-16s-31e, elev. 3,996 ft., dry, TD 3,512 ft.

Lea County: Devonian 1 Windfohr, 25-11s-35e, elev. 4,080 ft., San Andres 4,310 ft., dry, TD 5,130 ft.

DeKalb Agricultural Association 1 Phillips, 5-20s-38e, elev. 3,581 ft., Yates 2,910 ft., dry, TD 4,284 ft.

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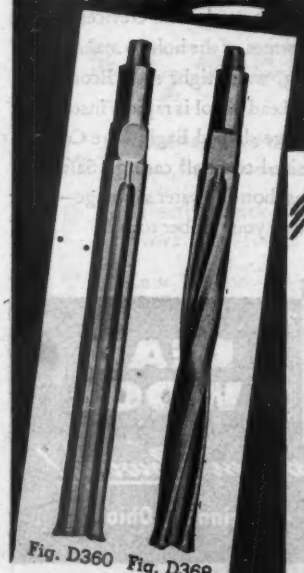

Fig. D360 Fig. D368

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TEXAS GULF COAST

Gulf Test Expected to Open Something New

HOUSTON.—Gulf Oil Corp. 22-C Kirby Lumber Co. et al, deep Wildcox test in the Cleveland field of Liberty County, is waiting on cement to set with 5½-in. casing set on bottom at 12,523 ft. in shale. This test is expected to open something new for this area.

Frazier et al 1 Lell et al, 4½ miles southwest of Hallettsville, Lavaca County, was reported flowing ¾ bbl. of 38.6° gravity oil and water per hour through 3/32-in. choke, tubing pressure 350 lb., casing pressure 540 lb., with the well going to 50 per cent water, from perforations at 5,914-18 ft. Total depth is 7,690 ft., with 5½-in. casing at 5,930 ft.

Cities Service Oil Co. 1 Winnie Poole, Ramsey field, Colorado County, ran drill-stem test on 20 perforations at 8,885-90 ft., using ¼-in. bottom and 12/64-in. and 7/64-in. top chokes, and flowed at the rate of 1,249,000 cu. ft. of gas per day, some 51.8 gravity condensate and some salt water, tester open 8 hours. These perforations have been squeezed to reperforate in the same zone. Test was made at bottom of the sand. Total depth of the hole is 9,052 ft., with 5½-in. casing at total depth.

Magnolia Petroleum Co. is preparing to complete as a pumper its 1 Herman Lauter in a new sand on the flank of the old Clay Creek area dome of Washington County. It swabbed 4 bbl. of 35° gravity oil per hour in perforations at 4,606-11 ft., and is waiting on pumping equipment. Total depth is 8,022 ft. with 7-in. casing set at 6,323. Two previous tests, one at 6,262-66 ft. and the other at 4,759-63 ft., had both recovered salt water.

General Crude Oil Co. et al 1 Warren Hill, outpost at Thompson field in Fort Bend County, is dry at a total depth of 8,250 ft.

Humble Oil & Refining Co. 2-B Donald and F. B. Duncan, wildcat about 1½ miles northwest of Spanish Camp gas production and about 6½ miles northwest of Hungerford, in Wharton County, was dry at total depth, 7,350 ft. Tests were made at 7,289-95 ft., 3,812-22 ft., 3,275-83 ft., and 2,900-08 ft.

UPPER GULF COAST WILDCAT COMPLETIONS

Colorado County: Quintana Petroleum Co. H. R. Cullen et al, 10 miles north of Columbus, in Chas. Frodtran Sur., dry at 2,283 ft. Completed as water well.

Harris County: ElTex, Ltd., 1 Bender estate, discovery, Spring area, Mary C. Bulrice Sur., total depth 6,249 ft., perforated with 12 holes from 6,243-47 ft., potential test 128.22 bbl. day, ½-in. choke, gas-oil ratio 300 to 1, tubing pressure 875 lb., casing pressure 1,300 lb., gravity 38.3, 0.2 per cent water.

Jackson County: P. R. Rutherford and Royal Oil & Gas Corp. 1 Paul Skarpe, J. Heard League, 5 miles southeast of Ganado, dry at 6,750 ft.

Jefferson County: Stanolind Oil & Gas Co. 1 Stanolind fee Caswell Trust, West Beaumont area, W. D. Dyches Sur., dry at 7,700 ft.

Lavaca County: Sterling Oil & Refining Co. 1 Mary Hoffman et al, D. B. Oakes Sur., 12 miles southeast of Yoakum, total depth 9,003 ft., perforations 144 holes at 7,716-50 ft., potential test 2,486,000 cu. ft. gas daily, 50 bbl. condensate day, 3/16-in. choke, tubing pressure 2,400 lb., casing pressure 2,200 lb. Discovery.

Wharton County: Humble Oil & Refining C. 2-B Donald and F. B. Duncan, Hungerford area, David Wade Sur., dry at 7,350 ft.

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APPALACHIAN FIELD

Newhart Completes Good Well in Washington County

PITTSBURGH.—In southeastern Ohio, NE Section 15, Ludlow Township, Washington County, Homer Newhart et al completed a good oil well as 4 Samuel Dickson. It produced 100 bbl. of oil along with a gas volume of 280,000 cu. ft. of gas from the Injun sand, total depth 1,420 ft. This is the largest well outside of the Clayton pool in Perry County of recent months. It was not shot.

In Raleigh County, West Virginia, Columbian Carbon Co. completed 7 Rowland Land Co. in Marsh Fork district gaging 3,181,000 cu. ft. gas from the Maxton sand, topped at 2,338 ft.; gas 2,385 ft.; total depth 2,390 ft. It is one of the largest strikes in the new field. The rock pressure at the end of 5 days is 550 lb.

The Preston County Oriskany wildcat of Wm. E. Snee et al on the Harry Sisler farm on Briery anticline in Portland district is now drilling through the Corniferous lime which, from a surface elevation of 2,186.48 ft., was topped at 5,580 ft. and the chert 5,613 ft. It is drilling at 5,681 ft. and making about 20 ft. a day in the hard chert formation. This member is expected to be between 175 to 200 ft. in thickness. As it is an outside wildcat in an area in which the lower Devonian has not been tested and on a closure, it is being closely watched. From convergence, it is regionally running high.

In Boone County, United Carbon Co.

completed another fair Big Lime gas well, 1,197 Siler Coal Land Co. gaging 1,641,000 cu. ft. with Big Lime topped at 1,239 ft. and total depth 1,400 ft.

In Barbour County, Hope Natural Gas Co. completed a second Benson sand gas well, 8,873 W. L. Morrison, which gages 212,900 cu. ft. from a total depth of 4,415 ft.

In Jackson County, Columbian Carbon Co. completed a fair Oriskany gas well in Ravenswood district with a gage of 1,671,000 cu. ft. of gas in 750 John Wells. Corniferous lime topped at 4,867 ft., Oriskany at 4,997-5,064 ft., shot at 4,998-5,045 ft., total depth 5,079 ft.

N. CENTRAL TEXAS

Multipay Sand Field Prospects Promising

WICHITA FALLS.—Southwestern Cooke County continues to hold interest of numerous North Texas operators, as prospects for a shallow, multipay sand field continued to improve. Kadane and Griffith 1 Hopkins, discovery in Section 18, BBBQCRR Survey, producing from conglomerate pay at 2,970-83 ft., flowed 66 bbl. in 1 hour through open 2-in. tubing and next hour made 82 bbl. before being shut in for storage. Paul B. Scott 2 Walterscheid, a north offset, drilled sand showing oil from 2,600-07 ft. and has run casing to test. The Texas Co. 1 Lynch, 2 miles southwest of Callisburg, total depth 5,670 ft. in lime, is waiting on cement after plugging back to 4,725 ft., with 7-in. pipe cemented at 4,724 ft. Same company 1 Rasure, Sivels Bend area, prepared to reperforate around 6,760 ft. and test.

In Archer County, Phillips Petroleum Co. 1 Bullington, Vogtsberger area, was drilling at 6,186 ft., still in the Ellenburger lime topped at 5,233 ft. It plans to drill through the Ellenburger section.

Continental Oil Co. 1 McNutt, 2 miles southwest of Bowie in Montague County, tested salt water at 7,233-99 ft., total depth, in the Ellenburger and was preparing to test good oil shows encountered higher up. Stanolind 1 Gossett, 8 miles southwest of Bowie, was drilling below 4,200 ft. Drilling activity in the Hildreth field continued high, with 10 rigs running. Three new locations were made in the field by Nu-Enamel Oil Operating Co. on leases formerly held in the name of F. L. Boutell.

Hamilton County.—C. I. Production Co., of Houston, 1 G. E. Lund, wildcat in the W. W. Trimble Survey A-1395, is preparing to test Marble Falls sand at total depth 3,237 ft., with pipe cemented about 10 ft. off bottom.

NORTH CENTRAL TEXAS WILDCAT COMPLETIONS

Archer County: D. H. Bolin 1-A Bill Threet, Blk. 92, Jefferson CSL Sur., 4 mi. S and 1½ mi. E Archer City, dry, TD 1,138 ft.

Fortex Oil Corp. et al 1 Lula Ikard, Jos. Levins Sur., A-260, 5 mi. S and 4 mi. E Archer City, dry, TD 1,059 ft.

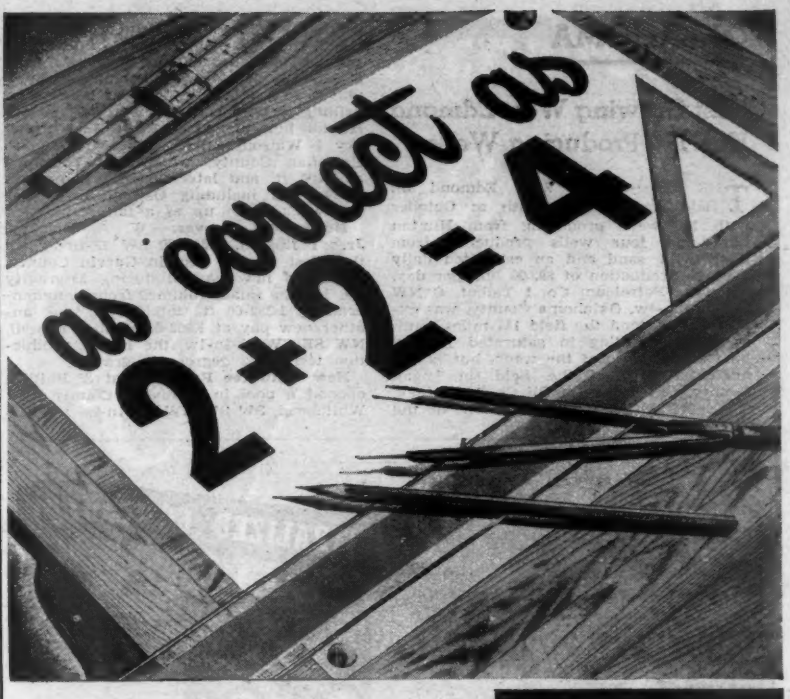
Collin County: Pure 1 A. T. Finley, Martha Herron Sur., 1 mi. N and ½ mi. E Celina, elev. 757 ft., dry, TD 6,002 ft.

Hardeman County: Humble 1 Emma T. Marshall, Sec. 240, Blk. T, W&NW Sur., elev. 1,555 ft., dry, TD 6,675 ft.

Jack County: Northern Ordnance 1 W. Pettus, R. Murkeson Sur., A-442, 5 mi. S and 3½ mi. E Bryson, dry, TD 3,253 ft.

Montague County: C. H. Murdick 1-B Ida J. Walthall, Samuel H. Smith Sur., A-662, 6 mi. N Bowie, Caddo 6,042 ft., dry, TD 6,343 ft.

Wichita County: Maquire Inc, 1 Imogene McClean, L. Powell Sur., A-242, 5 mi. W Burkburnett, dry, TD 1,912 ft.



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BREA, CALIFORNIA

OKLAHOMA

Fast Growing West Edmond Has 170 Producing Wells

THE three-county West Edmond oil field started the month of October with 166 wells producing from Hunton lime and four wells producing from Bartlesville sand and an estimated daily average production of 29,000 bbl. per day. Magnolia Petroleum Co. 1 Talbot, C NW NW 28-13n-4w, Oklahoma County, was expected to extend the field 1¼ miles south as it was drilling in saturated Hunton lime at the close of the week, but in the northeast edge of the field, in Logan County, Cities Service Oil Co. 1 Gaffney, C SE NE 29-15n-4w, was drilling in the Chimney Hill section of the Hunton with no oil showing. The test is 1½ miles from production. Allied Oil Co. et al 1 O'Brien, C SE SE 12-14n-5w, Canadian County, was flowing 250 bbl. of oil per hour while drilling in with cable tools at 7,008 ft., in Hunton lime topped at 6,962 ft. Ace Gutowsky 1 Watson, SE SE SW 23-14n-5w, in Canadian County, which was bottomed at 7,200 ft. and later tested in all zones up to and including Oswego lime, was last week given up as a failure.

North-West Hoover.—W. A. Delaney, Jr.'s 1 Russell, SW SE SW 13-1n-1w, in the West Hoover pool in Garvin County, opened a new pay producing 55-gravity oil, but in small volume, from conglomerate at 1,332-60 ft., total depth, and another new pay at 1,962-88 ft. in 2 Russell, NW SE SW 13-1n-1w, the 10-bbl. production testing 52 degrees in gravity.

New Okfuskee Pool.—Kubat & Phillips opened a pool in Okfuskee County in 1 Whitehead, SW SW NW 15-11n-9e, producing from Hunton lime topped at 3,856 ft., with pay at 3,898-3,910 ft.

OKLAHOMA WILDCAT COMPLETIONS

Canadian County: Sohio & Phillips 1 Swope, SE NE 12-14n-5w, West Edmond extension, flowed 397 bbl. in 3 hours from pay zone 6,970-7,015 ft., TD 7,080 ft., Woodford 6,915 ft., Bois d'Arc 6,965 ft.

Garvin County: Fox & Fox 1 Butler, SW NW SE 9-1n-1w, dry, TD 3,036 ft.

W. A. Delaney, Jr., 1 Russell, SW SE SW 13-1n-1w, discovery of new pay in Northwest Hoover pool, flowed 5 bbl. of 55° gravity oil from conglomerate sand at 1,332-60 ft., TD 1,474 ft.

W. A. Delaney, Jr., 2 Russell, NW SE SW 13-1n-1w, discovery of new pay in Northwest Hoover pool, pumped 10 bbl. of 52° gravity oil from sand at 1,962-88 ft., TD 1,990 ft.

Jefferson County: Bridwell Oil 1 Trout, SE SW SW 32-7s-7w, dry, TD 2,281 ft.

Lincoln County: Texas 1 Barrett, SW SW NE 19-13n-6e, dry, TD 4,560 ft., Wilcox 4,510 ft., second Wilcox 4,538 ft.

L. B. Jackson 1 Blakely, NE NW NW 21-15n-5e, dry, TD 4,505 ft., Wilcox 4,446 ft., second Wilcox 4,483 ft.

Okfuskee County: Kubat & Phillips 1 Whitehead, SW SW NW 15-11n-9e, flowed 135 bbl. through 8/64-in. choke, pay zone 3,898-3,910 ft., TD 4,123 ft., Hunton 3,856 ft., Sylvan 3,947 ft., Viola 4,030 ft.

Seminole County: Mealy-Wolf 1 Island, SE SE SE 24-9n-7e, dry, TD 3,584 ft., Wapanacuka 3,475 ft., Cromwell 3,550 ft.

McIntyre et al 1 Cornelius, SW SW SW 18-11n-8e, dry, TD 3,711 ft., Wapanacuka 3,665 ft., Cromwell 3,674 ft.

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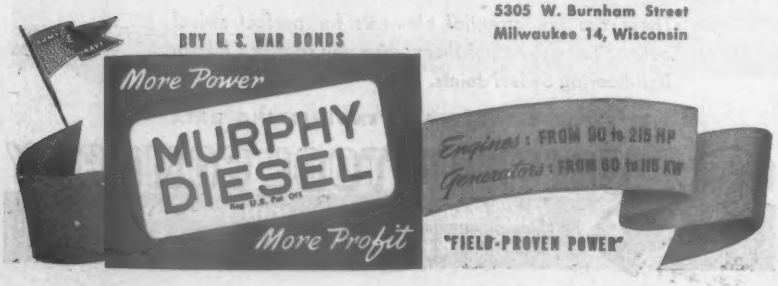

CANADIAN FIELDS

Pacific Oil & Refining to Try for Oil in Devonian

CHATHAM.—Following discovery of oil in the Devonian limestone in the Steveville field, west of Calgary, Pacific Oil & Refining Co. of Lethbridge is arranging to test the same formation in the Twin River-Del Bonita area, near the international boundary, by deepening Western Drilling 1, LSD 16, 3-2-20w4. This well, which got the Madison at 3,946 ft., is expected to get the Devonian at 5,000 ft.

West Central Turner Valley. — Okalta

Statement of the Ownership, Management, Etc., of
THE OIL AND GAS JOURNAL
October 7, 1944

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Mgr. Editor: H. Stanley Norman, Tulsa, Okla.

Business Manager: S. H. Rourke, Tulsa, Okla.

Stockholders holding 1 per cent or more of total amount of stock: Helen B. Lauinger, Tulsa, Okla.; P. C. Lauinger, Tulsa, Okla.; Estate of Edward R. Boyle, Oil City, Pa.; Edward P. Boyle, Oil City, Pa.

Known bondholders, mortgagees and other security holders holding 1 per cent or more of the total amount of bonds, mortgages or other securities: None.

S. H. ROURKE,
Business Manager.

Sworn to and subscribed before me this 25th day of September, 1944.

JOHN P. GALLAGHER,
Notary Public.

My commission expires March 1, 1947.

Oils 19, LSD 14, 18-19-2w5, got the Madison at 6,968-7,219 ft. and tested 140 bbl. Pacific Petroleum 7, LSD 11, 25-19-3w5, had the Madison at 7,220-7,440 ft. and made 100 bbl. after heavy acidizing in tight lime.

Taber.—Mid-Continent-Universal 1, LSD 12, 17-9-17w4, coring oil sand at 3,267 ft., got 3,000,000 cu. ft. of gas at 3,213 ft. Major-Taber 3, LSD 14, 9-9-17w4, 3,245 ft., tested 60 bbl. with heavy gas flow. Imperial-Clancey 3, LSD 4, 27-8-16w4, was dry at 3,283-94 ft.

Saskatchewan.—In the Muddy Lake area in western Saskatchewan, Bata Petroleums 2, LSD 11, 24-39-23w3, got 1,250,000 cu. ft. of gas at 1,633-44 ft.

OHIO, KENTUCKY

Ohio Fuel Gets Gasser In Holmes County

COLUMBUS.—Ohio Fuel Gas Co.'s wildcat in the northern part of Ripley Township, Holmes County, 1 S. C. Critchfield, Section 28, gaged 1,180,000 cu. ft. from the two lower pays in the Clinton formation. Sand at 3,082-3,087 ft. gaged 437,000 cu. ft. and at 3,116-3,131 ft. 743,000 cu. ft.

Natural Gas Co. of West Virginia completed a 1,087,000 cu. ft. well in an untested part of Pike Township, Stark County. The completion, 1 M. W. C. District, NW Section 17, found pay in the lower Clinton at 4,636-4,661 ft.

A 65-bbl. producer in the north part of the Granger pool was completed by Preston Oil Co. on S. G. Brown, Lot 10, Granger Township, Medina County.

Sinclair Prairie Oil Co. found no shows of oil, gas, or water in its Oriskany test in Washington County.

Texas Co. is drilling at 9,000-ft. Trenton Limestone test on H. B. Cark et al, SE SE Section 4, Union Township, Belmont County. Drilling is being done by rotary, the first hole to be drilled in Ohio by that method.

OHIO WILDCAT COMPLETIONS

Holmes County, Hardy Township: Kenova 1 Michael Haas, Lot 10, Clinton 3,449-3,454 ft., 3,470-3,498 ft., 3,512-3,536 ft., dry, TD 3,601 ft.

Ripley Township: Ohio Fuel 1 S. C. Critchfield, Sec. 28, Clinton 3,064-3,067 ft., dry 3,082-3,087 ft., 437,000 cu. ft. 3,116-3,131 ft., 743,000 cu. ft., TD 3,134 ft.

Salt Creek Township: Northern Ordnance 1 Albert Wengard, Sec. 25, Clinton 4,005-4,054 ft., dry, TD 4,105 ft.

Washington County, Lawrence Township: Sinclair Prairie 4 R. E. Hill, Sec. 25, Oriskany 5,121-5,184 ft., dry, TD 5,205 ft.

EASTERN KENTUCKY

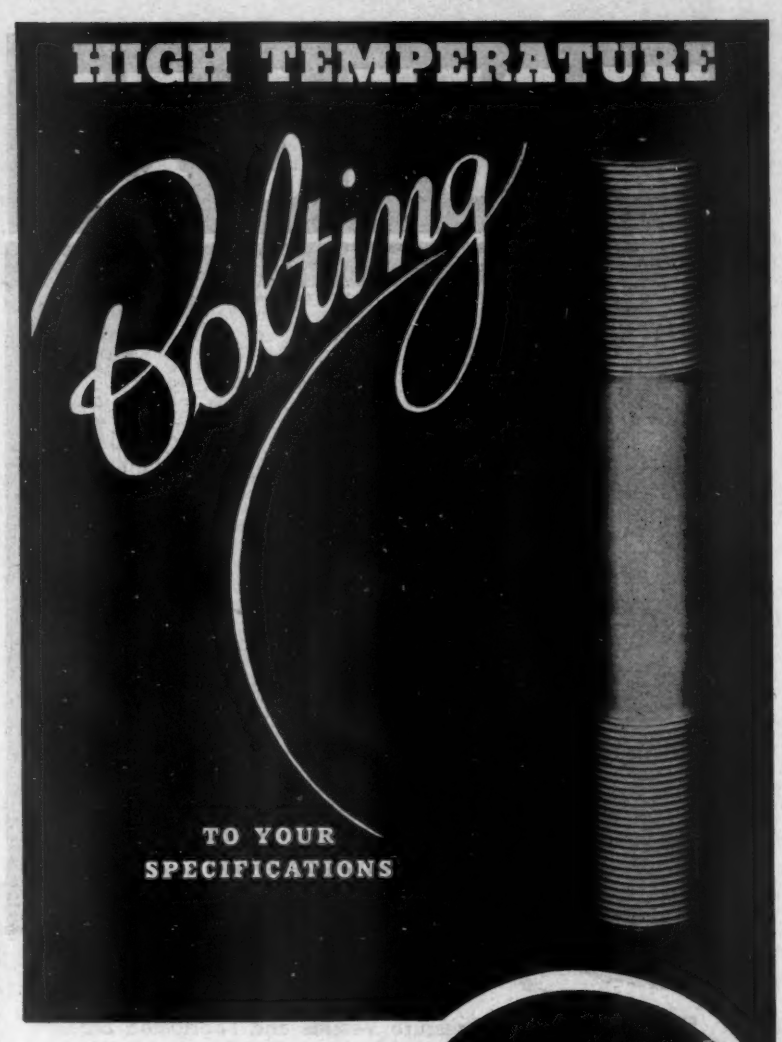
ASHLAND.—Two oil wells and one gas well were completed in Eastern Kentucky during the week with several new locations reported. Drilling operations displayed an uptrend and a number of other wells, including two deep operations, are nearing completion.

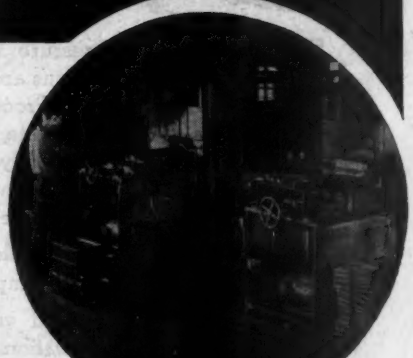
Ashland Oil & Refining Co. completed well 1 on the James H. Fraley land in Elliott County for 5 bbl. of oil daily. Total depth was 812 ft. J. W. Turner, trustee, completed 2 A. J. Oliver in Elliott County as a 5 bbl. well at a total depth of 908 ft.

The Kentucky West Virginia Gas Co. has completed well 754 on the Enoch Bolen land on Rock Fork in Knott County at 2,875 ft. in Big Lime with a daily open flow of 231,000 cu. ft. of gas.

WESTERN KENTUCKY

OWENSBORO, Ky.—Six oil wells averaging about 67 bbl. per well were com-





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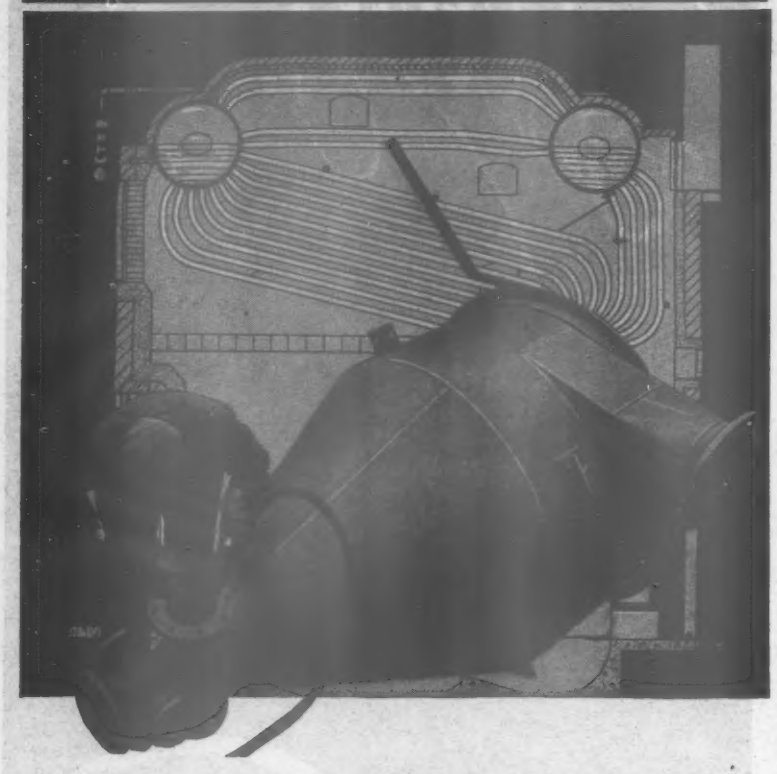

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PRESSURE VESSELS

STEAM GENERATING EQUIPMENT

pleted in Western Kentucky in the past week. One wildcat dry hole was also completed.

WESTERN KENTUCKY WILDCAT COMPLETION

Henderson County: Basin-Ashland 1 Mrs. S. E. Sowards, near C WL 14-P-21, 3 mi. W of Smith Mills, dry at 2,690 ft. Lower Menard 1,796 ft., Waltersburg 1,824 ft., Tar Springs 1,900 ft., Glen Dean 1,985 ft., Barlow 2,254 ft.

INDIANA

EVANSVILLE, Ind.—Eight completions reported during the week in Indiana included four oil wells and four dry holes. The oil wells averaged about 110 bbl. to the well. Two wells in southern Posey County made 176 bbl. and 150 bbl., respectively, in initial output.

INDIANA WILDCAT COMPLETION

Posey County: H. L. Cokes 1 Hill-Murphy, SE SW SE 7-4s-13w, dry at 3,031 ft. Lower Menard 2,078 ft., Tar Springs 2,166 ft., Weiler 2,571 ft., Aux Vases 2,828 ft., Ste. Genevieve 2,874 ft. No McClosky lime.

KANSAS

Ellis Co. Reagan Sand Discovery Pumps 563 Bbl.

SUNRAY Oil Co. 1 Orth, NE NE SW 2-14-20w, 9 miles west of Hays in Ellis County, which has been showing for a new pool opener, confirmed expectations by pumping 563 bbl. in 24 hours from the Reagan sand pay at 3,846-52 ft.

Barber County.—J. M. Huber 1 Gant, NW 32-30-13w, Viola lime wildcat north of the Lake City pool, was completed for 38,714,000 cu. ft. of gas from Viola pay at 4,617-21 ft. Gulf Oil Corp. 1 Good, SE NE 28-30-12w, plugged back from 4,680 to 4,020 ft., filled 2,300 ft. with water in 4½ hours from Kansas City lime, but later swabbed 2 bbl. of oil and 148 bbl. of water in 24 hours. J. W. Huber 1 Buck, SW SE SW 35-30-14w, had a small show of oil in Simpson at 4,311-30 ft., but found mud and water in an Arbuckle drill-stem test at 4,685-96 ft. Casing is being set at 4,457 ft. to test the Maquoketa dolomite.

Kearney County.—Carter Oil Co. 1 Strong, NW SE 27-22-35w, 12 miles north of the Hugoton field, showed for 5,000,000 cu. ft. of gas from Harrington sand at 2,586-2,609 ft., after plugging back from 3,033 ft., total depth.

Pratt County.—Skelly Oil Co. 1 Shriver, NE NE NE 33-29-14w, was flowing 10 bbl. per hour from Simpson sand at 4,560-63 ft. after a shot, and was making ready for a potential test.

First reports this week indicated a substantial pickup in activity, 46 new operations were recorded, including 9 wildcats, compared to 39 completions during the week, among which 11 wildcats were included.

KANSAS WILDCAT COMPLETIONS

Barber County: J. M. Huber 1 Gant, NW 32-30s-13w, 33,714,000 cu. ft. gas from pay zone 4,617-21 ft., TD 4,670 ft., Viola 4,608 ft., Kinderhook dolomite 4,560 ft.

Ellis County: Sunray 1 Orth, discovery, NE NE SW 2-14s-20w, pumped 563 bbl. from pay zone 3,846-52 ft., TD 3,852 ft., Arbuckle 3,833 ft., dolomite 3,843 ft., Reagan 3,846 ft.

Ellsworth County: Atlantic et al 1 Roth, NW SW SE 9-17s-10w, dry, TD 3,400 ft., conglomerate 3,290 ft., Arbuckle 3,350 ft.

Osage County: Ray Anderson et al 1 Woodward, SE SW SW 14-16s-16e, dry, TD 1,610 ft., Mississippi lime 1,523 ft.

Pratt County: Paul Hatfield et al 1 Grapes, SE NW NW 10-28s-15w, dry, TD 4,865 ft., Arbuckle 4,812 ft.

Rooks County: Eldorado Refining 1 Budd, SE NW SE 20-7s-16w, dry, TD 3,320 ft., Kansas City 2,932 ft., Arbuckle 3,292 ft.

Rush County: Sunray 1 Jacobs, SW SW NW 3-16s-19w, dry, TD 3,640 ft., conglomerate 3,599 ft., Reagan 3,632 ft.

Adair Morton 1 Schlitter, SW SE NE 18-16s-17w, dry, TD 3,553 ft., Reagan 3,542 ft., Quartzite 3,550 ft.

Russell County: Phil Han 1 Meir, NW NW NW 30-15s-12w, dry, TD 3,404 ft., Kansas City 3,042 ft., Cherty conglomerate 3,325 ft.

Sedgwick County: Phillips 1 Kellogg, NE NE SE 36-25s-3w, dry, TD 4,083 ft.

Beech Aircraft 1 Fisher, SW NE NW 13-27s-2e, dry, TD 3,293 ft., Simpson 3,202 ft., Arbuckle 3,286 ft.

LA.-ARK.

Huge Gas Discovery on Fire in De Soto Parish

SHREVEPORT.—A fire, reported to be due to a leak around the christmas tree, broke out at Phillips and Schoonmaker 1-A Anthony, SE NE 9-11n-14w, De Soto Parish, and was threatening to crater. The Anthony well was a huge gas discovery test, completed last month for an estimated 125,000,000 cu. ft. open flow capacity, and had been shut in pending completion of plans for an outlet.

Three new wildcat locations were announced this week, Calapor Manufacturing Co. 1 Edenborn estate in 20-7n-3w, Grant Parish; E. H. Demetric 1 Prudential Insurance in 23-10n-9w, Natchitoches Parish, and The Texas Co. 1 Kimball in 3-23n-9e, Morehouse Parish, near the Arkansas line.

ARKANSAS WILDCAT COMPLETIONS

Calhoun County: John T. O'Neil 1 Gaughan, NE NE 15-14s-16w, dry, TD 4,343 ft., elev., 103 ft.

Quachita County: Skelly 1 Russell, NE SE 29-13s-18w, dry, TD 2,990 ft., Cotton Valley 2,870 ft.

NORTH LOUISIANA WILDCAT COMPLETIONS

Claiborne Parish: Gulf and Houston Oil 1-I Muslow Oil, approx. NE NW 31-21n-7w, dry, TD 6,884 ft.

Tensas Parish: Chicago Mill & Lumber 1-A Mutual, SW NE 30-12n-10e, dry, TD 8,306 ft.

MISSISSIPPI WILDCAT COMPLETIONS

Jasper County: Kingwood Oil 1 Campbell Estate, SE NE NE 3-10n-10w, dry, TD 5,223 ft.

Madison County: Vaughey & Vaughey 1 Covington-Edgar, SE SE 19-10n-4e, dry, TD 5,174 ft., chalk 4,110 ft.

SOUTH LOUISIANA

Union Gets Producer in West White Lake

NEW ORLEANS. — Union Oil Co. of California has completed its 2-A State-White Lake to establish oil production at the West White Lake field in Vermilion Parish. Total depth is 10,750 ft., with 5½-in. casing set at 10,713 ft. It was completed in perforations at 10,684-88 ft. flowing 126 bbl. daily through ⅛-in. choke, 508,000 cu. ft. gas a day, tubing pressure 3,150 lb., gravity 37.4, 0.2 per cent cut. This well is 2,645 ft. north and 1,320 ft. west of the L.A State, discovery well, in 14s-2w. The discovery well was dual-gas completed, one of the producing horizons being at the 10,600-ft. level, evidently the same section from which the current well is flowing.

Continental Oil Co. 1 King Corp., Bayou Serpent area, Jefferson Davis Parish, 30-7s-6w, is drilling ahead below 9,200 ft. This test is credited with sand showing oil in the basal Frio at 7,150 ft. and sand showing oil at 7,780 ft.

Union Sulphur Co. 3 J. P. Gueno, 51-8s-2e, Acadia Parish, Branch field, after making repairs to the bottom liner, ran drill-stem test in the perforations at 11,085-90, and recovery was 15 stands of 43° gravity black oil in 18 minutes, with 4,500-lb. working pressure. The perforations have been squeezed and a new test is scheduled. Total depth of the hole is 11,316 ft. and 5½-in. liner is set at 10,478 ft.

WILDCAT COMPLETIONS AND DISCOVERIES

	Week ended September 30 1944					Cumulative total, 1944				
	Oil	Dist.	Gas	Dry	Total	Oil	Dist.	Gas	Dry	Total
Ohio	0	0	1	3	4	2	0	15	54	71
Indiana	0	0	0	1	1	4	0	0	19	23
Illinois	1	0	0	5	6	25	0	0	234	259
Kentucky	0	0	0	1	1	13	0	0	65	78
Michigan	0	0	0	5	5	11	0	2	185	198
Kansas	1	0	1	9	11	40	0	9	321	370
Nebraska, Missouri, Iowa	0	0	0	0	0	1	0	0	12	13
Oklahoma	4	0	0	6	10	53	0	20	207	280
Texas:										
North Central	0	0	0	7	7	49	0	1	236	286
West	1	0	0	1	2	34	0	3	125	162
Panhandle	0	0	0	0	0	0	0	2	8	10
Eastern	0	0	0	3	3	5	0	1	96	102
Gulf Coast	1	3	0	6	10	28	12	13	183	236
Southwest	0	0	0	4	4	19	4	14	181	218
Total Texas	2	3	0	21	26	135	16	34	829	1,014
Louisiana:										
Northern	0	0	0	2	2	4	0	1	44	49
Southern	0	0	0	0	0	6	6	0	38	50
Total Louisiana	0	0	0	2	2	10	6	1	82	99
Arkansas	0	0	0	2	2	2	1	0	45	48
Mississippi	0	0	0	2	2	3	0	0	54	57
Alabama, Georgia, Florida	0	0	0	1	1	2	0	0	21	23
Montana	0	0	0	2	2	3	0	3	33	39
Wyoming	0	0	0	1	1	13	0	1	17	31
Colorado-Utah	1	0	0	0	1	3	0	1	24	28
New Mexico	0	0	0	3	3	5	0	3	45	53
California	2	0	0	1	3	6	0	7	142	155
Total United States	11	3	2	65	81	331	23	96	2,389	2,839
Total previous week	6	0	4	55	65					

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8-5

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Among the Drilling Contractors

Olson Drilling Co., superintendent J. T. Peake has been transferred from Olney, Ill., to Oklahoma City.

Tract Drilling Co., Inc., Wichita, Kans., has obtained a state charter to operate an oil and gas drilling company and will begin operations as soon as the rest of the drilling equipment is available. Officers of the new company are: A. J. Gebert, president; Floyd Guggisberg, vice president, and John Jay Darrah, secretary and treasurer.

Manning & Brown, Inc., has been awarded drilling contract by Mountain Fuel Supply Co., for a 10,000-ft. test through the Tertiary beds on the Church Buttes structure, Uinta County, Wyoming. The test will be located in C SW NW 8-16n-112w. The test will be spudded as soon as tools are available.

Mohawk Drilling Co. has the Allied Oil Co. 1 Lockridge, in C SE SE 31-15n-4w, near the Lockridge townsite in the Logan County sector of the West Edmond field. Location has been staked.

E. F. Moran Drilling Co., Evansville, Ind., has the drilling contract on the Carter Oil Co. 13 Henry R. Skiles, in NE SW 15-8s-15w, Posey County, Indiana.

Herndon Drilling Co., Carmi, Ill., has been awarded the contract on the Ashland Oil & Refining Co. 3 J. W. Spencer and A. Vogel, in SE SW 32-6s-14w, Posey County, Indiana.

J. H. Woods, Petersburg, Ind., is the drilling contractor on the E. L. Shoudy 2 Sarah Rodemacker and Lorina K. Batts, in SW NW 15-3s-7w, Pike County, Indiana.

Harbor Drilling & Production Co., Wilmington, Calif., has started work on a new well for Standard Oil Co. of California on the Newhall Land & Farming Co. in the Del Valle field.

Ball-Dunlap Drilling Co., Los Angeles, a recent organization in the contract-drilling field, is drilling a wildcat for Richfield Oil Corp. in the Olive wildcat district of Los Angeles County and is down 2,360 ft.

Rocky Mountain Drilling Co., Los Angeles, is making good progress on a deep test which is being drilled for Standard Oil Co. of California in the Semitropic gas field, the present formation being a hard sand at 12,860 ft.

Helmerich & Payne, Inc., has been been awarded the drilling contract on a 6,000-ft. test Texas Co. has staked in SE SE NE 32-29n-8w, Grant County, Oklahoma. The test is the 1 Percy.

Fred Morgan will shortly move in a rig to drill a wildcat test for Keener Oil & Gas Co., Tulsa, on a Deep Rock Oil Corp. farmout in northeastern Pawnee County, Oklahoma. The test is the 1 Maitlen, in NW NE NE 17-23n-3e, about 2½ miles northeast of the Watchorn pool and on an island in the Arkansas River.

Helmerich & Payne, Inc., Tulsa, have contract to drill 1 Matheson, in NE NW NE, 19-10n-2w, east of the Moore field, in Cleveland County, Oklahoma, to the Wilcox sand for O. G. Harp. This contracting concern abandoned its 4 Freeman,

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which it drilled for its own account in SW SE SE of 14-1n-1w, Northwest Hoover pool, Garvin County, Oklahoma, to total depth of 1,641 ft.

Crow Drilling Co., Shreveport, was completing a squeeze job after getting salt water at 2,025-2,100 ft. in 1 Yarbrough, which it is drilling for its own account in 30-15-19, Ouachita County, Louisiana.

M. B. K. Drilling Co., Odessa, Tex., has been awarded the contract for drilling a 4,500-ft. wildcat in northeastern Midland County, Texas, for Richland Oil Corp. of California. The test is 1 Annie S. Boone, in Section 44, Block 36, T-2-S, T&P Survey.

Bosworth Drilling Co., Odessa, Tex., is preparing to move in rotary rig to drill Hunt Oil Co. 1 Bomar, a 6,000-ft. Fisher County, Texas, wildcat about 2½ miles northeast of Roby.

Production Forbidden Till Packers Are Repaired

EL DORADO. — Operators in the Dorcheat-Macedonia field have received from the Arkansas Oil and Gas Commission an order, effective October 1, directing that any well in that field which has been dually completed in the Cotton Valley sandstone section and the Smackover limestone section and where evidence of a leaking packer is shown by the fact that the Cotton Valley sandstone gas contains more than five grains of hydrogen sulfide per 100 cu. ft., shall be removed from the schedule of allowed production until repairs have been made. No production will be allowed from either section.

The purchaser of gas in the field has been requested by the commission to furnish from day to day a list of wells producing more than five grains of hydrogen sulfide per 100 cu. ft. from the Cotton Valley sections.

Bargaining Election Set For Tanker Personnel

WASHINGTON. — The National Labor Relations Board this week ordered separate elections for three groups of unlicensed employes on Standard Oil Co. of California deepwater tankers to determine collective bargaining representation. Date of election will be set by the director of NLRB's twentieth region.

At the same time, NLRB certified Oil Workers International Union, CIO, Local 449, as representative for bargaining purposes of operation, maintenance, and militarized guard employes of the Southport Petroleum Co.'s Texas City, Tex., plant.

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PERSONALS

L. H. PRICHARD

Quit Law Practice To Give All His Time to Oil

LEV PRICHARD, president of Anderson-Prichard Oil Corp., had been practicing law in Oklahoma City 4 years when, in 1913, the allurements of oil led him to take an interest, with others, in the drilling of several wildcat wells. The Cushing field discovery nearby, with its big wells, had electrified the Mid-Continent region and touched off a riotous boom. Fortunes were being made with breathtaking swiftness. For 2 years Prichard divided his attention between law and oil. His oil ventures turned out encouragingly. Then, in 1915, he discontinued his law practice entirely and from that time devoted all his time to the oil and gas business.

In May 1919, Prichard entered into an oil partnership with J. Steve Anderson, young real estate man who also had become infected with the oil fever. In 1922 the partnership was converted into a corporation, with each man owning 50 per cent of the stock. The corporation drilled 75 wells in 1943 and expects to drill at least that many this year. It has 25 proved leases in the West Edmond field of Oklahoma.

Prichard was born in Mississippi. He graduated from Mississippi College and received his degree in law from the law school at Millsaps College, Jackson, Miss.

A. C. Golden, Jr., has been appointed district superintendent of Pan American Production Companies' Southwest Louisiana district. His headquarters are at Pine Prairie.

William H. Whittekin has retired as vice president of Oil Well Supply Co. after 30 years' service and will devote his attention to oil-production interests and farming. At 18 Whittekin got a job as roustabout for Ohio Oil Co., later working as pumper, tool dresser and driller. Finishing interrupted schooling, he taught school for several years and then resumed oil-field work, first in California and later in Mexico. At Tampico he was one of the founders and secretary-treasurer of Tampico Foundry & Machine Co., also organizer and manager of Oil Well Supply Co. of Mexico. When the United States entered World War I, he enlisted, served overseas and became a captain of artillery. He was wounded at Meuse-Argonne. He was awarded two French and three American medals, including the Purple Heart and the Silver Star. Rejoining "Oilwell" in 1919, he was manager at Ranger and Wichita Falls, then for 10 years directed the company's activities in foreign oil fields. In 1932 he became vice president at the company's headquarters in Dallas.

C. O. Rison, formerly superintendent in Oklahoma City for Indian Territory Illuminating Oil Co., is now vice president of North Pacific Pipe Line Co., which plans to build a line from Harlowtown, Mont., to Seattle, Wash., and a refinery at Renton, Wash.

Leo D. Welch, a vice president of National City Bank of New York, has been named treasurer of Standard Oil Co. (New Jersey), effective October 16. He succeeds **J. E. Crane,** recently chosen a director of Standard.

Joel C. Ott has been made district superintendent in charge of operations in the Bayou des Glaise district, Louisiana division, by Humble Oil & Refining Co.

Dr. E. F. Davis, vice president of Shell Oil Corp., Inc., in Pacific Coast territory, in charge of production and geological work, has been appointed to a newly created position as vice president and chief consulting geologist. He will be in charge of all Shell general geological work. To succeed him **E. D. Cumming** has been appointed vice president.

G. F. Kaufmann, chief geophysicist for Creole Petroleum Corp. at Caracas, Venezuela, has been transferred to Standard Oil Co. of Cuba, with offices in Havana. Both organizations are subsidiaries of Standard Oil Co. (New Jersey).

B. I. Graves, vice president of Tide Water Associated Oil Co., has been named chairman of the petroleum industry East Coast supply and transportation committee, Petroleum Industry War Council.

E. O. Perkins has been named superintendent of the terminal division, refining department, of The Texas Co., taking the place of **J. E. Blake,** recently appointed assistant general sales manager of foreign operations.

F. H. McGuigan, district geologist for Lion Oil Refining Co. in West Texas and New Mexico, with headquarters in Midland, has been chosen South Permian basin representative of American Association of Petroleum Geologists, filling the place left vacant by **Oscar Champion,** who moved from the district.

Lt. K. R. Bowie, who was district exploitation engineer at Eagle Lake, Tex., for Shell Oil Co., Inc., before joining the Army, is now drilling engineer for a unit organized to drill and produce wells. He is stationed at Camp Santa Anita, Calif.

R. P. Russell, executive vice president of Standard Oil Development Co., was elected president last week, to succeed **Frank A. Howard,** who plans to resume private law practice after the first of the year. Until then Howard will remain a director of the company and vice president of Standard Oil Co. (New Jersey).

C. H. Metz, Jr., has been promoted from superintendent of No. 1 refinery of The Standard Oil Co. of Ohio, in Cleveland, to the new position of manager. **I. L. Peterson** has been advanced from assistant superintendent to superintendent of maintenance and construction, and **E. S. Bale** from chief of the technical service section, manufacturing

HOSPITALITY HEADQUARTERS for the Southwest

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department, to superintendent of process. Peterson and Bale will be Metz's assistants in top management of the refinery. Promotions announced by Metz include: **Albert Schoenfeld,** from master mechanic to assistant superintendent of maintenance and construction; **C. D. Crawford,** from senior engineer, utilities, to assistant superintendent in charge of utilities; **Oscar W. Walter,** cracking coil foreman to assistant process superintendent in charge of cracking; **R. B. Preston,** from refinery foreman to assistant process superintendent in charge of distillation and treating; **W. S. Diffenderfer,** from foreman of the asphalt department to assistant superintendent in charge of the department. All the promotions follow the recent dedication of Sohio's new 100-octane unit.

C. W. Strance, who served Lone Star Gas Co. as scout, paleontologist, public-relations man and drilling supervisor, has been named chief supervisor of the Oil and Gas Division of the Texas Railroad Commission. He had been head of the commission's Houston office.

Floyd J. Nicholson, assistant land agent for Shell Oil Co., Inc., in West Texas and New Mexico for the past 4 years, with his headquarters in Midland, has been transferred to Salisbury, Md., taking charge of the land department in offices opened by Shell to handle operations in Maryland, Virginia and North Carolina.

LEGAL

OIL AND GAS LEASE

UNITED STATES DEPARTMENT OF AGRICULTURE, Forest Service, Jackson, Mississippi, September 28, 1944. Sealed bids in duplicate will be received until 2:00 P.M., Central War Time, October 30, 1944, and then publicly opened, offering bonus for operating rights in connection with gas and oil leases on seven parcels of national forest land located in Franklin and Lincoln Counties, Mississippi. Parcel number one contains approximately 1,513 acres in Township 5 North, Range 2 East, Sections 12, 13 and 24; and Township 5 North, Range 3 East, Sections 10, 25, 26, 30 and 37. Parcel number two contains approximately 608 acres in Township 6 North, Range 2 East, Sections 25, 26 and 29. Parcel number three contains approximately 1,459 acres in Township 6 North, Range 2 East, Sections 13, 25, 26, 29, 37 and 38. Parcel number four contains approximately 1,339 acres in Township 6 North, Range 4 East, Sections 24 and 25; Township 5 North, Range 4 East, Section 1; Township 6 North, Range 5 East, Sections 30 and 31; and Township 5 North, Range 5 East, Sections 5 and 6. Parcel number five contains approximately 1,314 acres in Township 8 North, Range 5 East, Sections 14, 15, 22, 23, 26, 27, 34 and 35. Parcel number six contains approximately 272 acres in Township 6 North, Range 1 East, Sections 23 and 28. Parcel number seven contains approximately 117 acres in Township 6 North, Range 2 East, Section 37. Separate bids will be received on the seven parcels. Award of lease will be made only to bidder who can show sufficient experience and financial resources and prove citizenship. Interested parties may obtain bid documents, lease forms and operating regulations from the Forest Supervisor, Masonic Building, U. S. Forest Service, Jackson 114, Mississippi.

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See Pages 2194 to 2111 in 1944 Composite Catalog

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Industrial Items

National Tube Co. Acquires New Operating Division

C. R. Cox, president of National Tube Co., U. S. Steel Corp. subsidiary, has announced completion of arrangements for the acquisition of the buildings and properties of Tubular Alloy Steel Corp. in Gary, Ind., which has become an operating division of National Tube Co.

Operation of Tubular Alloy Steel Corp. in Gary was launched early in 1942 to increase production of seamless tubing of alloy steels essential to the war effort. In becoming established as an independent United States Steel Corp. subsidiary, Tubular Alloy operated mechanical facilities and other equipment owned by Defense Plant Corp., using the plant site and buildings which had been acquired from National Tube Co. The move does not change the existing arrangement with Defense Plant Corp. which continues to hold title to the mechanical facilities and other equipment.

Leo J. Mason, vice president of Tubular Alloy Steel Corp., is in charge of the Tubular Alloy Steel Division and retains his headquarters in Gary.

New Power-Control Unit Auxiliary Drum by Hyster

Hyster Co., Portland, Ore., and Peoria, Ill., has announced a new power control unit auxiliary drum for use with the D4 towing winch made exclusively for the Caterpillar D4 tractor.

The new unit, while designed as a bulldozer power control unit, provides many additional hoisting and towing services with the Caterpillar D4 or R4 tractor. Simple, quick acting and with only one lubricating fitting it presents no service problems.

Multiflame Heating Nozzles

A new heating nozzle, designed particularly for use with oxygen and the liquefied petroleum gases or natural gas, is now offered by Victor Equipment Co., 844 Folsom Street, San Francisco. This heating nozzle fits all standard Victor welding torch butts but can also be sold complete.

The design features of this particular nozzle incorporate an outer air mantle to protect the nozzle head against deflected heat. Its internal design is such that the cool and premixed gases carry away a substantial amount of accumulated heat, and in doing so become efficiently preheated for proper combustion. Similar multiflame heating nozzles are also available in numerous sizes for use with oxyacetylene.

The larger multiflame heating nozzles are recommended for flame priming and descaling in inaccessible areas. All of them can be employed for various silver brazing operations, preheating and bending.

New Airco Heating Torch With Multiflame Tips

A new medium-weight heating torch has been announced by Air Reduction Sales Co. This new torch (Style 9802) is especially designed for concentrated localized heating such as is required for bending, straightening and shrinking of steel plate as well as for silver-brazing of heavy copper plate in the manufacture of copper pipe. The torch is lighter in weight than heating torches that have been available in the past yet it has equal gas capacity.

Five new multiflame acetylene heating tips as well as two multiflame propane heating tips are available for this torch. Three mixers are available for the torch, viz., for positive-pressure acetylene, low-pressure acetylene and for propane. The available extensions include a 12-in. straight extension and 18, 24 and 42-in. angular extensions.

Franks Model 7000 D.D. Is New All-Service Unit

Franks Manufacturing Corp., Tulsa, has completed and placed in field service an improved Model 7000 double-drum "All-Service" unit designed for extreme adaptability and economy in rig-up and tear down, transportation, and cost of erecting permanent derrick. The unit is completely portable, and carries a telescoping derrick with a maximum height, when extended, of 96 ft. The derrick telescopes and folds over the cab in such dimensions that it is available for transportation either over traveled highways or over average oil field roads.

Design of the unit was concentrated upon providing a piece of equipment, completely portable, which would answer any servicing requirement.

The power unit is variable upon specifications, and may be up to 875 cu. in., thus providing all the engine power necessary to work normal depths and to 10,000 ft. where rod or tubing jobs are required. Four or five sheaves may be used with drum space for a maximum of 17,531 ft. of ⅝-in. line on the main drum and 13,415 ft. on the sandreel. The drums may be equipped either with the standard 10-in. brakes or 8-in. when required.

M. W. Kellogg Co. Opens New Office

M. W. Kellogg Co., petroleum and chemical engineers, of Jersey City and New York, announce the opening of an office in the Mellie Esperson Building, at Houston, which will specialize in keeping Gulf district refiners informed through close personal contact on significant trends and advances in the field, particularly with respect to the extensive postwar studies now being conducted by that company's engineering division. The new office is in charge of W. T. McCay, who has been associated with the oil-refining industry in the Gulf area for a number of years.

Colonel McClenahan Receives Order of British Empire

Col. R. W. McClenahan of Philadelphia, now attached to the staff of Maj. Gen. Elwood R. Quesada of the Ninth Air Force Fighter Command, has been awarded by King George of England the Order of the British Empire for distinguished service in cementing relations between the Allied Nations.

Colonel McClenahan was given leave of absence from American Meter Co. in March 1942, and was shortly thereafter sent to the middle east for special service.

Trade Literature

Victaulic Co. of America, 30 Rockefeller Plaza, New York 20.—Plastic-bound catalog, describing the company's line of Victaulic couplings and fittings. The catalog is studded with practical installation photographs and is complete with data in various industries and tables giving dimensions, weights and applications to existing pipe lines using other methods of coupling. Victaulic couplings have been on portable pipe lines laid sometimes at the rate of 30 miles a day by the British Eighth Army in Africa and the British and American Armies in Italy and France.

Timken Roller Bearing Co., Canton, Ohio.—A 78-page book, "Evaluating the Forgeability of Steels," published by the company's steel and tube division, which contains recommended forging temperatures of 68 steels, as determined by the hot twist test conducted in the company's laboratories.

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